

JUL 5 1921

Railway Age

SECOND HALF OF 1921—No. 1

NEW YORK — JULY 2, 1921 — CHICAGO

SIXTY-SIXTH YEAR

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No. 80 "ACCO"

RAILWAY SIGNAL CHAIN *for* Conductors' Valves

Railway Age

SEVENTY-FIRST QUARTO VOLUME

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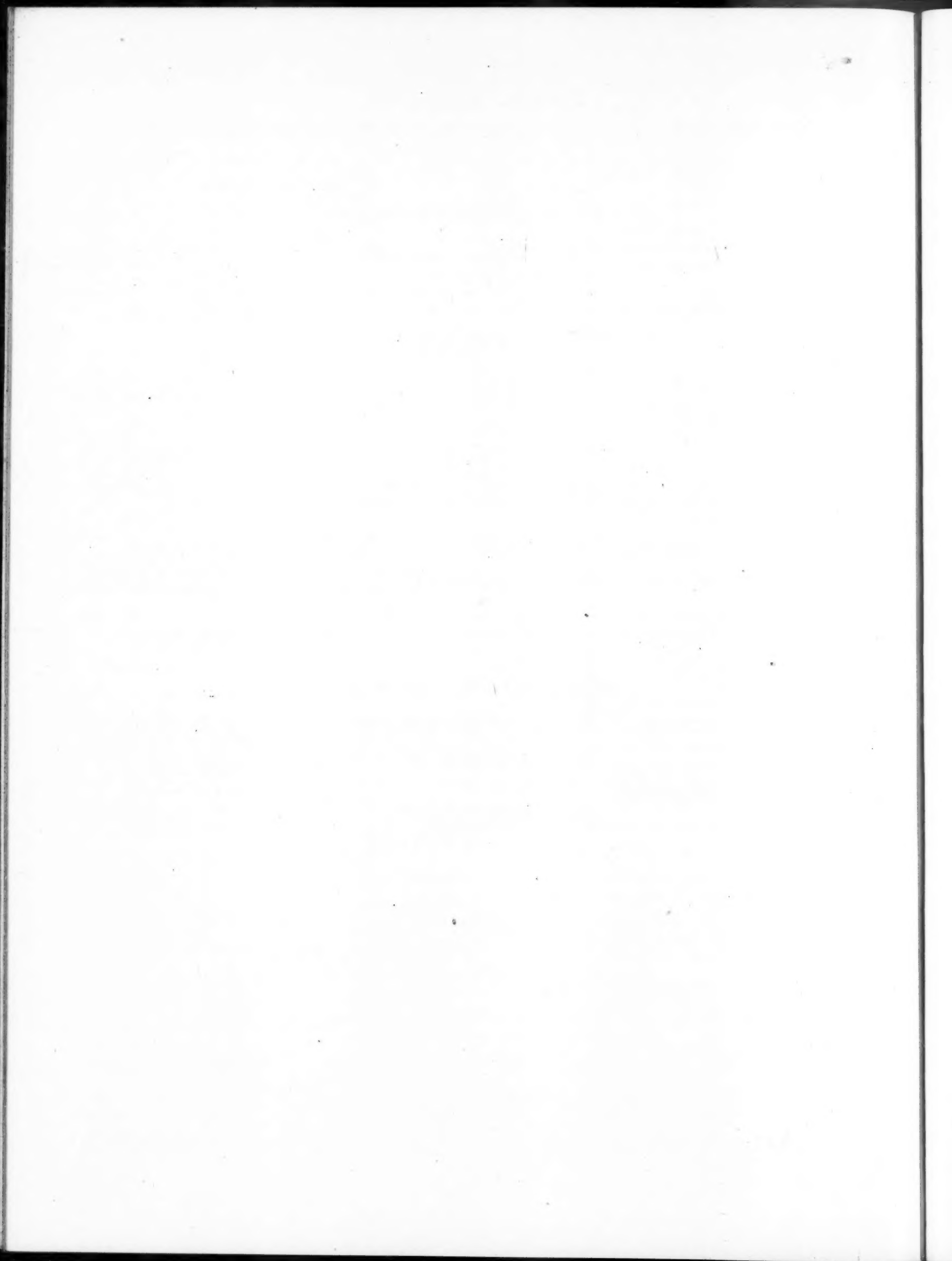
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SIXTY-SIXTH YEAR

1921
SECOND HALF



EDITORIAL

Railway Age

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In the *Railway Age* of June 10, page 1304, there was published an editorial calling attention to the importance of making a careful survey of freight car conditions to determine which cars are to be repaired and which replaced with new equipment in view of the recent increases in freight car loading and decreases in the freight car surplus. The editorial referred to the large increase in the number of bad order cars, which was 324,969 on May 15 and which has increased to 341,337 on June 1, and to the rapid reduction of the number of surplus cars, which was 450,164 on May 15 and which has since been reduced to 381,746 for the week of June 15. Our statements gave the impression that the bad order cars are included in the surplus cars, but it should be understood that bad order cars as reported by the Car Service Division of the American Railway Association are not included in its count of surplus cars. This is supposed to cover only cars other than those reported as in bad order which are not required for service during the period covered by the report, although as cars are taken from the surplus for service, many are found to be in bad order. The situation as to the number of freight cars not required for service during the present slump in general business conditions is therefore much worse than is generally understood, as the total of the cars out of service both because of their bad condition and because there is no demand for them is over 700,000, or about 28 per cent of the total car equipment. While the large number of bad order cars represents a serious situation, the margin of available surplus cars of most kinds is still very large. Past experience has shown, however, that a substantial revival of general business will wipe out a large car surplus in a short time.

Bad Order Cars Not Included in Surplus Reports

It is said that "any machine that will run" is good enough for a railroad shop and while most railroad men realize the falsity of this statement, it is seemingly borne out by the large number of obsolete, worn-out machines now in use. In many cases, particularly at the present time, it is impossible to get the capital necessary to replace obsolete machines, but that the fundamental economics of the situation are not fully understood is evidenced by the large number of such machines still in operation. It would be far better practice and less expensive to shut down many of them and transfer the work to other shops where modern machinery is available. Take, for example, a powerful, modern wheel lathe as compared to one built 30 or 40, or maybe 50 years ago. The former, using feeds up to $\frac{5}{8}$ in., removes all the stock in one cut and on an average turns a pair of tires every hour, depending on the operator's skill and the toughness of the cutting tool. The antiquated machine, however, struggles along under a feed of $\frac{1}{8}$ in., requires several cuts if the tires are badly worn and has difficulty in turning a pair in three or four hours. It is evidently false economy to run old machines of this type since the resultant cost of labor, power and delayed equipment is three or four times as much as necessary. The difficulty in obtaining capital for new ma-

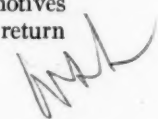
Machine Tool Depreciation

chinery can be overcome by establishing adequate depreciation accounts, a matter which has been woefully neglected in the past judging by the 1920 statistics of the Bureau of Railway Economics. According to the analysis, 191 Class I companies had set aside for shop machinery depreciation the sum of \$236,157, or less than one per cent of the value of all railroad shop machinery. This assumes that machines have an effective life of 100 years and is obviously absurd. Some competitive industries find it necessary to renew machine tools inside of two or three years or be left hopelessly behind in the race and, while conditions are different in the railroad business, some reasonable life should be assumed for machine tools not exceeding 10 or 15 years and 10 per cent, or 6.66 per cent, of the value of railroad shop machinery be set aside annually. Then at the end of 10 or 15 years, as the case may be, it will be possible for the shops and roundhouses to benefit by the installation of new and improved machinery which will not be held up because of difficulty in obtaining the necessary capital.

The vital relation of machinery, equipment and design to efficient locomotive terminal operation is generally conceded. It is true that no terminal can be operated economically without adequate coal and ash handling facilities, machine tools, boiler washing and refilling systems, drop pits, etc. The arrangement of this equipment also is important as a determining factor in promptly handling locomotives, but it should not be forgotten that the prime object of any terminal development is to maintain locomotives in condition to earn revenue as large a proportion of the time as possible. For the accomplishment of this purpose, methods are fully as important as physical equipment and the methods of handling locomotives at terminals are worthy of the closest study. It is especially important to develop highly trained inspection forces for the careful, periodical inspection of all equipment. To quote a statement made recently by a mechanical officer on the firing line: "The time to cure an engine failure is before, not after it occurs. This is where adequate inspection comes in—to learn to look beneath the surface, to locate the unseen cause, to anticipate a developing weakness." The present opportunity should be taken to develop and train engine terminal inspection forces because at most points more time than usual is available for this purpose. Repair men also should be taught the best methods of doing their work and be shown the need for care and thoroughness. Future savings will be assured by assigning men to the inspection forces to make minor repairs promptly. This will avoid making out work-report slips and hunting up men to attend to small jobs which can be handled more readily at the time of inspection. For the heavier work it has been found advisable to post work-report sheets and issue individual slips to each man who has a defect to repair. This eliminates picking easy jobs and fixes the responsibility. In many cases the work of the outside inspectors, with their assistant repair men, in looking after minor defects as found will make it unnecessary to put certain locomotives over the turntable and will allow for their immediate return

Locomotive Inspection and Repairs at Terminals

1



to service, thereby increasing the capacity of the terminal. Unquestionably the present offers a splendid opportunity for the development and training of engine terminal inspection and repair forces, thus establishing a potential engine house capacity which will undoubtedly be needed in the future.

President Harding's Opportunity

THE RAILROAD situation presents to President Harding his greatest opportunity for rendering speedily a most important public service. Whether his rendering of this service would bring him an immediate increase of popularity is speculative. It would take courage; and the American people admire courage. The doing of what he can quickly do to improve the railroad situation would stimulate a return to normalcy and prosperity more perhaps than anything else he could do. Public men seldom have been hurt by doing things that improved general business.

Under normal conditions the railroads are among the largest purchasers of numerous classes of commodities. For months they practically have been out of the market. Profound depression prevails in every industry which sells a large part of its product to them. With traffic and total earnings increasing and substantial reductions in wages and other expenses coming there is bound to be soon a substantial increase of railway purchases. But the increase should be more than substantial. It should be extremely large. A very large increase in railway purchases would stimulate business of all kinds. Directly, it would cause an increase of employment and production in the iron and steel industry in the lumber industry, in the coal industry, etc. Larger production and employment in these industries would in turn cause increased production and employment in all the industries from which they buy.

Increased purchases by the railroads are needed immediately not only to stimulate general business activity but to enable the carriers to equip themselves to handle the large traffic which will be offered to them when general business does revive, as sooner or later it is bound to revive.

The very small purchases made by the railways for several months have been due, broadly speaking, to two reasons. One of these has been the inadequacy of their earnings because of excessive operating costs and the severe decline of traffic. The other, which is not so obvious and generally understood, is their financial relations to the government.

Under government control the government invested over a billion dollars in the railroads. If the war and government control had not come part or all of this would have been invested by the railroad companies which would have raised most of it by the issuance of securities. The larger part of it now constitutes a debt to the government which sooner or later the companies must pay. They would raise money by the issuance of securities and pay it at once if securities in sufficient amounts could now be sold. Owing, however, to the present bad financial condition of most railroads, which is chiefly due to the war and government control, they cannot sell enough securities to pay it.

While the companies owe many millions of dollars to the government, the government in turn owes many millions to the companies. The government guaranteed adequately to maintain the properties while it had them and in addition to pay the same net return the roads earned in the three "test" years. It authorized the companies themselves adequately to maintain the properties during the first six months of private operation and guaranteed in addition to pay them any part of the standard return which they did not earn in those months. The government did not adequately maintain the properties while it had them and under its guarantees it owes the companies large sums, the exact amount of which, however, it will take a long time to determine.

Some officers of the Railroad Administration have taken the position that the indebtedness of the government to the companies should be used currently to offset the indebtedness of the companies to the government—that if, for example, a railway owes the government one million dollars for money invested under government control in permanent improvements, and the government owes the railroad one million dollars for under-maintenance or as part of its standard return they should settle by neither paying the other anything now. The railways contend that the government should loan them, or in effect take their notes, for a period of ten or fifteen years for what they owe it, and determine and pay them as soon as practicable the amounts it owes them for under-maintenance and as standard return.

To many persons the policy favored by some administration officials may seem logical and fair; but it is not logical or fair, and if carried out would have a very bad effect not only on the railroads but on general business. When the government took the railroads their properties were in good physical condition. Their net earnings were as large as in previous years and they had sufficient working capital to do their current business. It returned them in deteriorated physical condition and with greatly reduced working capital; and since the guarantees of net return were withdrawn, owing to excessive operating expenses and the violent decline in traffic, their properties have further deteriorated and they have practically been stripped of working capital. If the government loans them for ten or fifteen years what they owe it and at the same time as rapidly as practicable pays them what it owes them they will be able to begin at once using what it pays them to liquidate their large floating indebtedness to supply and material companies, to replenish their working capital and to make up the large amounts of deferred maintenance which have accrued. They must pay the government interest on what they owe it, and as it is only fair to assume they are to be allowed in the next ten or fifteen years to earn reasonable net returns, it is also only fair to assume that at the end of this time they would be able to raise enough by selling securities to pay the government off.

Since the government ultimately would get back its money, and in the meantime would get interest on it, it would not lose anything. On the other hand, if the railroads are required now to offset what the government owes them with what they owe the government they will be largely deprived for years to come of power adequately to increase their working capital, to pay promptly their debts to material and supply companies, and to rehabilitate and improve their properties.

If the government should adopt the policy of loaning to the railways for a term of years what they owe it and at the same time paying as promptly as practicable what it owes them, it would be necessary for Congress to make a special appropriation to provide funds with which to pay the railroads. Apprehension has been expressed lest Congress would be unwilling to make the appropriation. Why, however, should Congress be unwilling to make an appropriation necessary to do justice to the railways and carry out a sound business policy which would be beneficial to the entire country? For the government to loan to the railways for a period of years the capital invested by it in their properties would be to follow practically the same policy that the government actually is following in not insisting upon payment by foreign governments of the principal or even the interest upon the ten billion dollars which this government loaned to foreign governments to help its allies in the war. Why should the government of the United States deal more leniently with foreign governments in respect to money it loaned them for war purposes than with the railroads of this country respecting money which in effect it loaned them for war purposes?

The President undoubtedly has great influence with Congress. If he should outspokenly and energetically favor a policy in dealing with the railroads which business conditions and the welfare of the public demand he undoubtedly could get Congress to pass the legislation and make the appropriation necessary to carry out that policy. If the right policy in dealing with the railroad situation is adopted under his administration it will do more to restore normalcy and prosperity than anything else that is done. On the other hand, if the right policy in dealing with the railroads is not adopted the restoration of normalcy and prosperity will be hindered far more than most people appreciate.

The great economic problem of President Wilson's administration was the currency problem. It was solved and the country has benefited immeasurably. The great economic problem of the present administration is the railroad problem.

The judgment, courage and leadership of President Harding will be tested by the way he deals with it.

Future Railway Expenses and Rates

THE GENERAL reduction in railway wages authorized by the Railroad Labor Board went into effect on July 1. On the basis of the number of employees in 1920 this would mean a reduction of expenses of over \$400,000,000 a year. But the number of employees is now less than last year. On the basis of the number on the payroll in the first three months of 1921 it would mean a reduction in operating expenses of about \$365,000,000. Other reductions of expenses are occurring. The prices of materials and supplies and of fuel have declined somewhat. The amount of freight being shipped, and, consequently, the total earnings, are increasing.

These developments are, from a railway standpoint, very favorable. But they do not solve the railway problem. Because of inability to get large amounts of money the government owes them, and of very small net earnings since the guarantees were withdrawn, the railways are extremely short of money.

Furthermore, at present a widespread agitation for general reductions of rates is going on. Many classes of shippers are not in sympathy with it. The National Industrial Traffic League, composed of the traffic managers of the great industrial concerns and commercial organizations, has adopted resolutions opposing any general reductions until the railways have had a chance to get on their feet financially and to make a good start with the rehabilitation and increase of their facilities.

On the other hand, there is widespread discontent among the farmers regarding the present rates. The farmers as a class are suffering severely from present conditions. The prices of their products have declined until, according to government reports, they average only about 15 per cent more than before the war. The prices of most of the things they buy have not declined anywhere near in proportion. Their present situation is due in only a small measure to the present rates. But the farmers and their organizations, especially those in the west and south, for over forty years have tended to attribute a disproportionate part of their troubles to alleged excessive railway rates. Many of them are doing this now.

They are the most important, and, when they exert themselves, the most powerful class of our people. It is probably no exaggeration to say the future of the railways is in their hands. In the long run they will largely dictate the country's policy of regulation and even determine whether we shall have private or public ownership. It would be folly to ignore their attitude. No legitimate effort should be spared by the railways to make plain to the public, and especially

the farmers, the railways' own attitude regarding rates and the reasons for it.

It is not the position of the railways that no reduction of rates should be made. Their spokesmen all concede that owing to the horizontal percentage advances which were made in 1918 under government control, and again in 1920, there are now many rates which are unfairly discriminatory or too high. They agree that these unfair and harmful adjustments of rates should be rapidly eliminated, and chiefly by reductions. They hope and believe that in time increases in traffic and reductions of operating expenses will make practicable and desirable some general reductions of rates. They are opposed to general reductions in the immediate future because they believe they would be not only unfair and harmful to the railways, but contrary to the public welfare.

One argument widely used in favor of general reductions is that the rates are preventing revival of general business and an increase of traffic. But, as heretofore pointed out by the *Railway Age*, the freight being shipped has been increasing as rapidly since the recent slump in traffic as in 1919 before the last advance in rates was made. The increase in car loadings since the end of February has been about 20 per cent.

Even more convincing evidence is afforded by the statistics regarding the shipments of farm products. The prices of these products are relatively lower as compared with pre-war prices than those of any other large class of commodities. The advances in the rates on them were relatively the same as on other commodities. Therefore, comparing with pre-war times, the rates on farm products are higher relatively to present prices than on almost any other commodities. Nevertheless, shipments of farm products have increased more relatively within recent months than almost any others. From January 1 to June 11, 1921, the total carloads of grain shipped was 876,581. This was 61,803 carloads more than in the same part of 1919, and 119,628 carloads more than in the same part of 1920. The number of carloads of fruits and vegetables shipped in the present season up to June 20 was 361,471, an increase over last season of 58,670 carloads. A few weeks ago propaganda was started to show that canteloupes could not be shipped under the present rates from the Imperial Valley of California. Up to June 20 of this year the total shipments were 5,170 carloads, as against 4,497 last year.

Demonstration that commodities can be and are shipped in increased volume under the present rates will not, however, make the producers satisfied with the rates. Many of the producers are not making as large profits as they did last year, or even reasonable profits, because they are receiving much lower prices. Many of them believe these reduced prices are mainly due to the higher rates, and unless shown that this is not the case, and that in the long run early general reductions in rates will be against their interest, they will insist on them.

Valuable testimony regarding the relationship of freight rates to prices of farm products was given recently by W. H. Williams, chairman of the Wabash, in the hearings before the Senate Committee on Interstate Commerce. He showed that on cattle sold in Chicago at \$8.60 per 100 lb., the rate from Sioux City, Iowa, to Chicago, was 44 cents per 100 lb., or only about 5 per cent of the price. On hogs sold at \$9.25 the rate from Des Moines was 40 cents, or about 4 per cent of the price. On a bushel of wheat sold in Chicago for \$1.47, the rate from St. Cloud, Minn., to Chicago was 15.6 cents, or less than 11 per cent of the price. Another example that may be cited is that on a canteloupe selling at retail in Chicago for 35 cents, the freight rate from California was about 4 cents. The consumer paid enough for it to cover the transportation charge, reasonable profits to the retailer and the produce merchant, and a fair price to the grower.

If the grower did not get a fair price this was not due to the railway rate.

On most commodities of general consumption the freight rates, although higher than for years, are still low compared with the value of the commodities. Mr. Williams showed a 40 per cent increase on a box of apples from the State of Washington to Toledo amounted to only 32 cents; on a crate of 30 dozen eggs from Kansas City to Detroit only 18 cents; on a pair of shoes from New England to Chicago only 1.8 cents; on a barrel of flour from Minneapolis to Toledo only 16.33 cents.

Shippers, including the farmers, are as much concerned regarding the service the railways can render as regarding the rates. However low the rates may be in proportion to the prices of commodities, the shippers might in their own interest be justified in demanding immediate general reductions if these would not be practically certain unfavorably to affect the railway service that could be rendered. But the quality and the adequacy of railway service will necessarily depend upon the earnings the railways make. If they are not able to earn enough to maintain their properties and get a net return which will make it possible for them to raise large amounts of new capital to provide additional facilities, they will not be able to give good and adequate service.

Past experience repeatedly has shown that whether traffic can be moved satisfactorily, or even at all, depends more on the ability of the railways to furnish cars and other facilities than on the rates charged. What is the present condition of railway facilities? In every period of active business for years there have been congestions and car shortages. The railways today have about 340,000 freight cars in bad order, because for months they have not earned enough to maintain them. Their net return during the eight months the present rates have been in effect has averaged only 2.4 per cent. Without a large reduction in their operating costs, and a large increase in their net returns, they cannot prepare to render more and better service.

It may be said, the increases in traffic which are occurring, and the reductions of wages and other expenses which are being made, will enable them to rehabilitate their properties, raise new capital, and, in addition, make general reductions of rates. But nobody will know what the total amount of the reductions of expenses, or the effects produced by them on the financial condition of the railways, will be for some time. The farmers and other producers have been suffering greatly from bad business conditions recently, but the railways have been suffering even more. Why, therefore, not refrain from agitating for general reductions in rates until there has been opportunity to find out what financial results the railways can get on the present rates and with reduced expenses? If the outcome justifies reductions of rates, the Interstate Commerce Commission can be relied on to require them.

The advance in rates granted last August was based upon estimates of future operating expenses. These proved so far wrong that even when the railways were handling a large business they were failing at the rate of \$500,000,000 a year to earn the net return expected. This shows the hazards involved in estimates based upon numerous uncertain factors of great importance. A large part of the recent losses the railways have incurred have been due to these mistaken estimates. Any general reduction of rates proposed would have to be based on estimates of future traffic and expenses, which might prove to be equally erroneous.

Fairness to the railways and the welfare of the country demand that future changes in rates shall be based on actual experience, and the only experience on which they can reasonably be based will be experience under the existing general scales of rates and the new scale of expenses which is now in process of being established.

New Books

Railway Signal Engineer. By Leonard P. Lewis, of the Caledonian Railway (Scotland). Cloth, 358 pages, 5½ in. by 8¾ in.; 251 illustrations. Published by D. Van Nostrand Company, 25 Park Place, New York.

This is a second edition of the well-known work of Mr. Lewis, lecturer at the Royal Technical College, Glasgow. The first edition was noticed in the *Railway Age* of July 11, 1913. Being a lecturer, Mr. Lewis has a careful habit of anticipating the questions of the reader. As the book is devoted practically to mechanical interlocking and the manual block system, there is nothing about power interlocking nor about automatic block signals, but it is a very careful and detailed treatment of English practice in all parts of the field which is covered.

The preface to the second edition says that the extensive installation of track circuits constitutes the principal advance made in English signaling practice since the publication of the first edition, but only four pages are given to track circuits.

Fuel Economy on Locomotives. 51 pages; 3¾ by 5¾, cloth backed paper binding. Published by the American Railway Association, V. R. Hawthorne, Secretary, Mechanical Division, 431 South Dearborn street, Chicago.

The need for a manual of firing practice and of instructions in the principles of fuel economy for locomotive enginemen and firemen has long been recognized. Early in its history the International Railway Fuel Association gave considerable attention to this subject and at the 1912 and 1914 conventions laid the foundation for such a manual which it was proposed later to develop more fully. The first actual results, however, other than the development of such manuals by a few individual railroads, was accomplished by the adoption of the report of the Committee on Fuel Economy of the American Railway Master Mechanics' Association as recommended practice following the 1915 convention of that organization. This manual has stood as the recommended practice of the Master Mechanics' Association and its successor, the Mechanical Division of the American Railway Association, until the revision which was made and adopted by the Mechanical Division in 1920, to be followed by the further revision effected by the Joint Committee on Fuel Conservation of the Operating, Mechanical, and Purchases and Stores divisions this year. The principle revisions are the elimination of the text references to and the illustrations of cross firing and the addition of material concerning the proper firing of anthracite coal and fuel oil, the bringing up to date of the special instructions for the operation of superheater locomotives and the addition of about 15 pages of general information largely dealing with locomotive conditions affecting fuel economy, a small part of which is of more interest to roundhouse forces than to the engine crews and might, therefore, not improperly be omitted from a discussion of the subject intended primarily for distribution among enginemen and firemen. The book is well bound for pocket use, is well illustrated with colored plates showing various firebox conditions affecting proper combustion, and altogether is a material improvement over its predecessor. It is furnished by the association to members in lots of 100 copies or more for \$20 per hundred, in lots of 50 copies for \$12.50 and in less than lots of 50 copies at 30 cents each. Single copies are 60 cents each to non-members. The book will be of particular interest to those roads that have not already developed manuals of their own and any railroad that desires special printing on the cover or title page or wishes to incorporate these rules in a more extensive book in which are included special rules to meet local conditions, may arrange for such special printing.



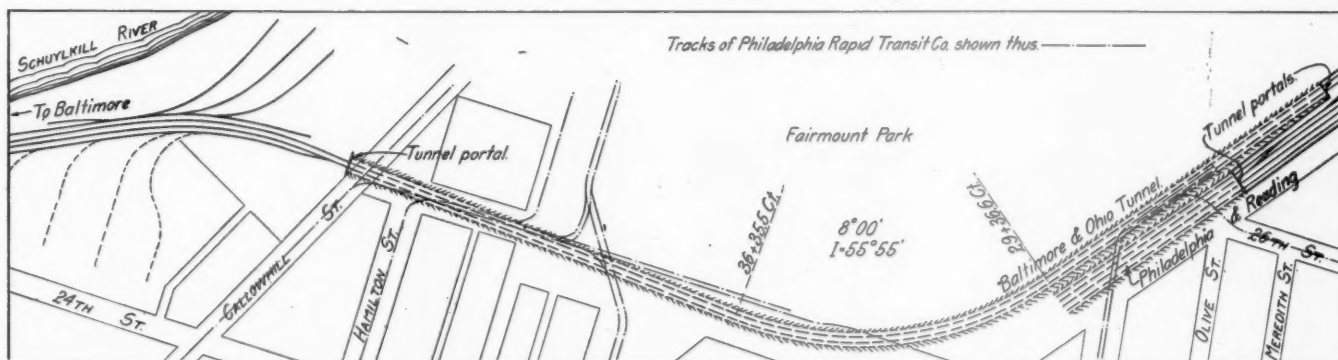
A General View Showing the Design and Method of Construction

Reconstructing a Tunnel With Modern Methods

The Baltimore & Ohio Employed Locomotive Cranes for
Complicated Work, Requiring Few Men

THE BALTIMORE & OHIO has recently rebuilt the west end of its tunnel under Fairmount Park at Philadelphia, Pa., and is now engaged in rebuilding the east end. Built under particularly adverse conditions, originally as a double-track tunnel with a central section of six-ring brick arch and end sections of I-beam construction and limited clearance, the ends are being rebuilt in the form of a three-centered arch of more modern design. Since the clearance was restricted by the grades of the streets over the tunnel

between the Baltimore & Ohio and the Philadelphia & Reading. All freight and passenger traffic of the Baltimore & Ohio to and from New York or other points north of Philadelphia as well as the interchange between that road and the Reading is handled over this piece of double track. This connection is about two miles long between the Chestnut street station of the B. & O. and the junction with the Reading and passes through the outskirts of Fairmount Park. The tunnel itself passes under the junction of several of the



Map Showing the Location of the Tunnel

an interesting method was devised to construct and handle the forms as well as the materials. New side walls as well as parts of the arches and in some places the complete arch itself were constructed of concrete. Locomotive cranes were utilized to handle and move the materials. As a result of the methods adopted the labor force was kept at a minimum throughout the work of rebuilding. The tunnel was opened from the top and all new work carried on from the level of the surrounding ground.

The tunnel has a total length of 2,300 ft. of which approximately 700 ft. of the central section is on an eight-degree curve. It carries two tracks which form the connecting line

busiest entrances to the Park where it carries street railway lines and an exceptionally heavy automobile traffic.

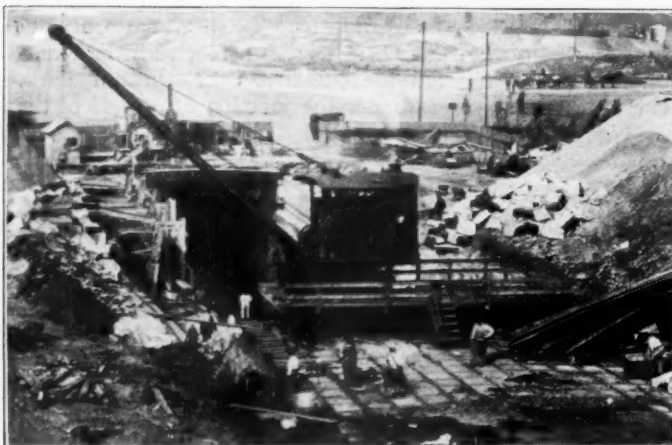
It was originally constructed and built in two separate and distinct types of tunnel design. The central part, extending from a point 246 ft. from one end to a point 478 ft. from the other or a total length of about 1,576 ft. was built as a six-ring brick arch, supported on masonry walls having a clear width of 30 ft. between faces. The clearance above the top of rail was 20 ft. The two end sections were provided with a roof construction consisting of built-up wrought-iron I-beams spaced three feet center to center and giving an average clearance of 17 ft. 6 in. The tunnel roof itself was

built up of 3-ft. square galvanized steel buckle plates butted against each other and riveted to the I-beams as well as to longitudinal lines of wrought-iron angle bars. A three-inch layer of asphalt had been applied on top of this as a protective covering or waterproofing. When this asphalt covering was removed after 35 years of service, the surface of the plates were found to be in a condition equal to that of new material.

The greatest deterioration and in fact practically the only deterioration was in the I-beams. These had naturally been affected by the locomotive gases and were, as a result, in a condition justifying renewal. While this was an influencing factor in the determination to rebuild the two end sections of the tunnel at this time the chief cause was the decision of the city to extend its limits for Fairmount Park to include the land adjoining and surrounding the line of the tunnel. In order to carry out this work the city planned to fill in and terrace certain sections of this land, making in some cases, a fill of about 13 ft. over parts of the tunnel. While the old roof construction was considered to have a life of at least five or six years longer, there was an element of doubt as to whether it could carry this additional load and still have the same life. In addition there was the certainty that its reconstruction at some future time would have to be carried out from the inside. It was therefore decided to rebuild before the fill was placed.

Conditions Necessitate Special Design of Arch

The type of arch decided upon varies slightly from the regular standard of the road since it was necessary to secure some increased clearance while at the same time keeping the top of the outside of the roof of the tunnel at about the same grade as before. This led to the adoption of a three-centered arch with radii of 7 ft. 9 in. and 32 ft. The springing line is 9 ft. 5 1/8 in. above the top of rail and marks the line to which the old masonry side walls were removed and replaced



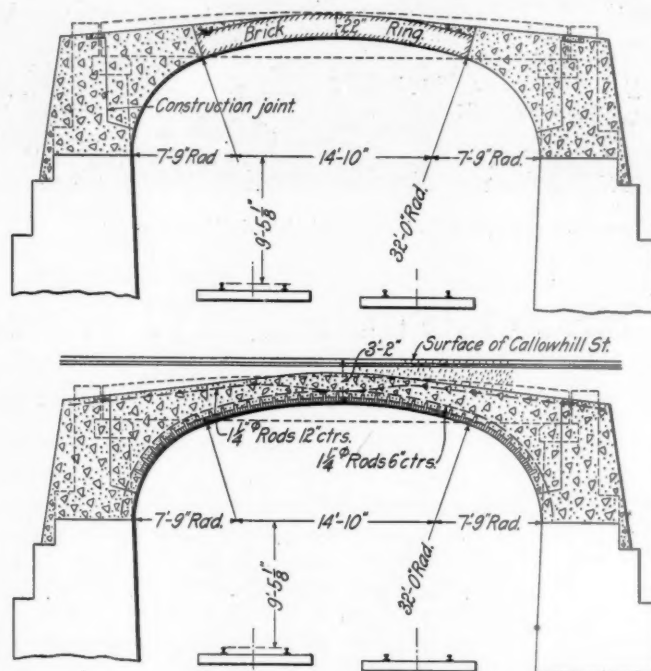
Tearing Out the Old Work with a Crane and Traveler

with concrete. The old walls, constructed of Conshohocken stone, were carried on the solid rock which underlies the ground in this section at about three feet below the top of rail. The inner surface had been given a slight batter while the rear had been carried up in a series of steps. The design adopted required that the old masonry be removed down to the new springing line and that a new concrete wall in the form of a skew-back be carried up to practically the same height as the old walls.

In all sections except under Callohill street, at the extreme west end of the tunnel, the two 7-ft. 9-in. segments were poured with concrete. The 32-ft. radius arch was built up of five rings of brick with a herringbone bond at every fifth brick. The concrete segments were lined with a row of bricks,

every fifth brick being a header. The solid arch under Callohill street was of the same general cross-section. One row of brick was laid with every fifth brick a header as in the 7-ft. 9-in. arches of the main design. However, the entire arch was poured as one unit and reinforced by long 1 1/4 in. corrugated round iron rods laid 6 in. center to center. Each alternate rod followed the contour of the arch, the remaining rods running comparatively straight across the arch proper.

As stated previously, the west section of the tunnel lies under one of the streets leading into Fairmount Park or specifically under Twenty-fifth street. Two streets also crossed at right angles, one of which had to be kept open at a time. The work was started at the junction of the old



Typical Tunnel Sections

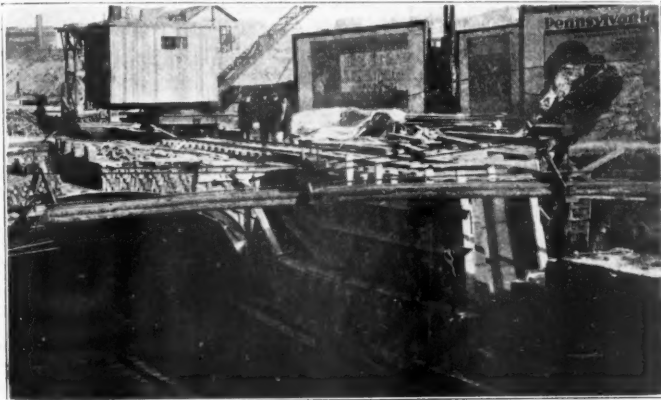
I-beam construction with the original brick arch and proceeded toward the portal. In order to keep one street open, work under an intermediate street, Callohill street being at the portal, was carried on simultaneously with the first part in order that that street could be opened for traffic and the remaining one closed in sufficient time as to not interrupt the continuity of the work.

Two Cranes Greatly Facilitate the Work

Prior to the beginning of this reconstruction two 15-ton cranes, concrete mixers, one-yard buckets and other equipment were brought to the site. The concrete mixer was fixed in one location and was never moved during the progress of the work. The first crane was brought in alongside the end of the old brick arch, where it remained until it had removed the street car rails, the pavement and other miscellaneous material covering the old tunnel roof. It was also used in removing the old roof structure which it picked up and swung to one side, opening up the tunnel itself. With the tunnel once opened up, the crane was run up on a traveler extending the full width between the tunnel walls and operating upon tracks laid along the old walls. This materially facilitated the work of this crane since it could pick up and deposit either new or old material from a considerable distance on either side of the tunnel.

With a section of the tunnel roof thus removed and one crane mounted on a traveler free to move longitudinally, the work of reconstruction was really begun. The old masonry walls were torn out down to the springing line and forms

constructed for the new. The old masonry was in this case removed by the second crane which operated on a track laid partly on the line of the old wall and partly on the adjoining land. This crane operated between the mixing plant and the section of wall torn out and, after removing the masonry on both sides, placed the concrete in the forms. For this purpose one-yard buckets were used. These were filled at the mixing plant after which they were picked up by the crane,



The Concrete Work Was Kept Close Up to the Masonry

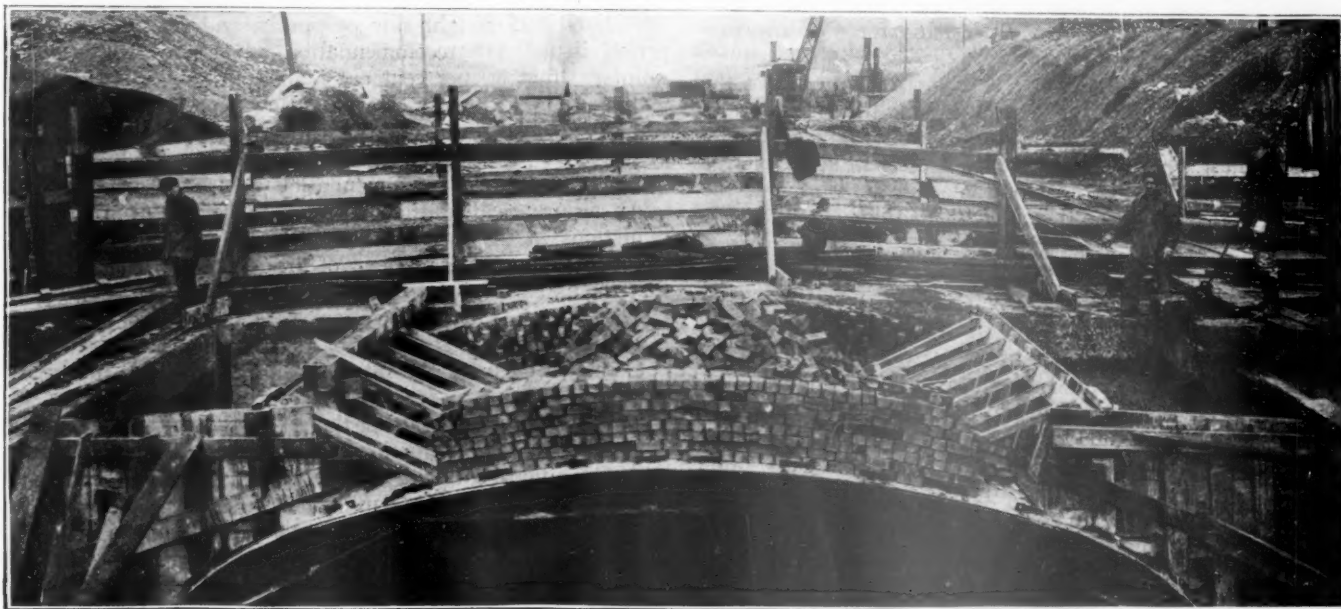
carried to the forms and dumped. As each section of new wall was completed, additional track was laid so that the crane could always operate up to the point where the masonry had been torn out.

Light Steel Centering Proves Readily Adaptable

While this work was under way, the first crane on the traveler was continuing to tear out the old roof structure, opening

sary to carry the lagging flush with the surface of the centering rather than over the top, as it is usually done. This was accomplished as follows: The centering was made in sections consisting of four of the steel centers spaced five feet apart and held in these relative positions by means of light steel bracing. Heavy wooden blocks were bolted to the web of the I-beam section, their upper edges being brought to the proper height so that 3-in. by 4-in. lagging notched to fit around the flanges could rest securely on them and at the same time be flush with the surface of the centering. This gave a section 15 ft. long, three such sections being used.

Before work on the new arches was commenced a line of timbering was built along the masonry wall and capped with an eight-inch timber. These lines of timbers, one on each side of the tunnel, supported the centering in position and also acted as runways upon which it could be moved ahead as needed. They were also used as supports for the concrete forms. The steel centers were lowered into position by means of the crane operating on the track along the wall, after which they were tied together and the lagging installed. Eight-inch wedge blocks under each steel arch were used to bring them to the required height. Once in position they were loaded at the center to keep them sprung tightly against the skew-backs, after which forms were erected for each of the 7-ft. 9-in. radius arches. These were then poured and allowed to set, a single row of brick being laid previous to the pouring, as already described in the design. When the concrete had set sufficiently the forms were removed and the remainder of the arch completed in the manner customary for brick arches. As each section was completed, the wedges were knocked out and the centering lowered approximately five inches on to a series of three-inch rollers. At the same time adjustable rollers mounted on the sides of the steel centering were run out to thrust against the concrete side walls, thus steadying the centering and preventing it from binding or



The Centers Were Loaded While Pouring the 7 ft. 9 in. Radius Arches

up more and more of the tunnels. The work of building the new arches then followed. As the clearance was very limited it was necessary to design and build special centering for the work. This consisted of light built-up steel forms, the outer surface of which was made to correspond to the finished curve of the arch down to the line of the haunches. From this point it extended straight down, thus giving a small clearance which, when the forms were dropped, facilitated their being moved readily. Again because of the clearance it was neces-

twisting as it was moved forward. In this way it was possible to drop the centering, move it forward to the next set-up and raise it to position, all in a very short time and with very little labor effort.

At Callohill street a reinforced concrete arch was built. In this case a single row of brick was laid, after which the entire arch was poured at one time, no construction joints being made except at the skew-backs. At this street there were several water, gas and electric light pipes and cables

which had to be carried across on temporary bridges or cables. When the arches were completed these lines were rearranged to follow the sidewalks. As a finishing covering and to waterproof the tunnel construction a three-inch layer of asphalt was spread over the entire roof structure, overlapping the joints between the side walls and the arches.

The force required for this work was very small, chiefly because of the advantageous use of the cranes for handling and placing all the materials, etc. During the period when all classes of work were being carried on at one time only about



A Locomotive Crane Was Used in Placing the Centers

32 unskilled and 15 skilled laborers, including carpenters, hoisting engineers, etc., and a supervising force of approximately 8 men were employed.

This work was designed by and carried out under the direction of the engineering department of the Baltimore & Ohio, H. A. Lane, chief engineer, Richard Mather, district engineer and J. G. Teders, assistant engineer in active charge of the work in the field. The contractor on the work was the Empire Engineering Co., Inc., Baltimore, Md.

Progress in Rate Reductions

FOLLOWING UP the statement recently made before the Senate Committee on Interstate Commerce by Edward Chambers, vice-president of the Atchison, Topeka & Santa Fe, that thousands of rate reductions had been and were being made by the railroads, American Railroads, published by authority of the Association of Railway Executives, has obtained from various freight bureaus further information as to the progress in rate adjustments.

Mr. Chambers' data were to May 1. The reports now published cover the period to June, and show that the process of eliminating rate maladjustments is proceeding at a rapid pace.

The Transcontinental Freight Bureau (Chicago) reports that up to June 9, 1,272 reductions have been made in west-bound domestic rates, 153,319 reductions in eastbound rates, and 120 reductions in export and import rates. The reductions affect grain, iron and steel, food products, lumber and many other commodities.

Since June, 1920, the Western Trunk Line Committee has considered 1,200 subjects; over 90 per cent of these were reductions and nearly all affected rates increased last year. These reductions concern more particularly crushed rock,

gravel, building materials, grain, coal, lumber, live stock feeds and molasses. The reductions range from 5 to 70 per cent, this maximum reduction being on paper and lumber. As representative of the action of this and other traffic associations, the following table is presented:

	Number of applications on which reductions were approved	Range of percentage reduction
Products of agriculture:		
Grain, hay, fruits, vegetables and seeds.....	70	10 to 50
Products of animals:		
Live stock, fresh meats, packing house products and green salted hides.....	16	15 to 33½
Products of mines:		
Coal (hard and soft), ores, sand, gravel and crushed stone.....	70	10 to 60
Products of forests:		
Lumber, logs, sash, doors and blinds.....	13	5 to 70
Manufactures:		
Petroleum oil.....	9	8 to 30
Brick, cement and lime.....	24	7 to 60
Iron and steel rails, structural iron and ferro-manganese.....	15	10 to 50
Sugar and molasses.....	6	12 to 45
Paper and paper articles.....	17	14 to 70
Miscellaneous commodities:		
Not specified above (car-loads).....	73	6 to 70
Less carload rates.....	10	8 to 30
Industrial switching rates.....	20	22 to 50
Total.....	343	

In the month of May, F. A. Leland, chairman of the Southwestern Freight Bureau, says that 159 out of 168 cases acted upon involved rate reductions.

"In this statement," Mr. Leland says, "we have made no effort to multiply the number of rate reductions by reason of the fact that some of the rates apply from a large number of points, or to a large number of points. Technically, a reduction in a rate applying from 10 points to 100 points is 1,000 reductions. Such situations as that we treat as only one reduction."

According to a report, dated June 11, from N. W. Hawkes, chairman, New England Freight Association, for the period August 25, 1920, up to June 1, 1921, that association has considered 695 freight rate proposals, and has in the same period issued 348 recommendation advices, of which it is estimated that 80 per cent are reductions.

The Trunk Line Association (New York) states that in trunk line territory from September 1, 1920, to May 31, 1921, 2,662 rate proposals were taken up, of which 2,463 were approved and recommendation advices issued.

An accurate calculation has been made of the number of reductions in the month of May, which is fairly representative of the whole number of transactions involved. In that month 98 per cent of the changes in rates passed upon by the Trunk Line Association were reductions, according to advices from the secretary of the association.

Commenting upon the rate situation in general, American Railroads says:

"With all the savings that the railroads can hope to make as a result of wage reductions and other economies, it is only with the utmost difficulty that they can hope to earn the \$475,000,000 necessary to meet their fixed charges for 1921.

"There can, therefore, be no general reduction of rates this year.

"The best the roads can do is to readjust rates on the existing level so as to remove inequalities and maladjustments that have resulted from successive blanket increases.

"This issue of American Railroads is devoted largely to showing the extent to which—within the lines of possible action—the roads are meeting the needs of shippers."

THE SAFETY DEPARTMENT of the Missouri Pacific, which is conducting a campaign to reduce accidents among its employees, awarded first place in its "Safety First League" to the shops at De Soto, Mo., for the month of May. During this period the 382 employees at the De Soto shops worked without an injury of any kind.

Settlements With Government Under Consideration

Administration Again Interested in Railroad Situation—I. C. C.
and U. S. R. A. Apparently Disagree

WASHINGTON, D. C.

THE PRESIDENT and the administration are again interesting themselves in the railroad situation, this time in an effort to bring about an earlier settlement of the claims of the railroads against the Railroad Administration and their claims for the six months' guaranty period, with a view to giving the roads some relief which will enable them to pay their bills, get their equipment in condition for a heavy crop season, and to help put an end to the buyer's strike by resuming purchases. For a long time the administration has been looking at the railroad problem principally from the standpoint of rates, but the frequent postponement of dividends recently and the rapid approach of another interest date has served to draw its attention back to the financial aspect of the situation. The question of the settlements between the railroads and the government was the subject of an extended discussion at a dinner given by President Harding to a group of western bankers on June 23, and it was the main theme at the cabinet meeting the next day, after which the President held a conference on the subject with Director General Davis of the Railroad Administration, Chairman Clark of the Interstate Commerce Commission, Secretary Mellon of the Treasury, and Secretary Hoover of the Department of Commerce. While no definite conclusions were reached, it was stated at the White House that the administration wants to do anything it consistently can to expedite a settlement which will help put the railroads in a position to "break the jam" but that it is a question of negotiating a settlement which the administration thinks fair and that an important question of policy is in dispute. In a formal statement given out after the bankers' dinner it was stated:

"The greater discussion in the conference hinged on the relief of the railroad situation. There was no disguising the serious nature of the railway problem. It was generally reported that unless there was some relief worked out in the settlement of the government's obligations to the railroads, which date from the federal war operation, not only could nothing be expected in the way of a railway contribution to the revival of business, but their own recovery would be long delayed."

Railroads Key to Resumption of General Business

There was a very general agreement among the bankers that the railroads represent in large measure the key to the resumption of general business and they promised to interest themselves in the matter by joining the government in an effort to expedite a fair settlement. From the Washington viewpoint this apparently means that the railroads will be asked to scale down their claims considerably in return for an agreement that the government will pay them much more promptly than it could if it is necessary to carry on a protracted controversy over the amounts and then take a test case through the courts. In fact, a number of large roads have recently made settlements by which they have accepted much less than the amount of their claims.

The "important question of policy" referred to, which is responsible for much of the delay in settlement, has to do with the interpretation of the contract governing the government's obligation to maintain the railroad property during the period of federal control, and the same standard of maintenance as provided in the contract is, by the transportation act, made the measure of the amount the Interstate Commerce Commission may allow for maintenance expenditures in computing the guaranty for the six months beginning March 1, 1920. The Railroad Administration under

Director General Davis is adhering to the same interpretation of this contract as to maintenance as was adopted by Mr. McAdoo, Mr. Hines and Judge Payne while they held the office of director general, namely, that the government's maintenance obligation was to be measured by the maintenance expenditures of the test period multiplied by a factor to represent the increased wages or increased cost of material. The railroads, on the other hand, are insisting on a basis of the cost of actual physical reparation, which would require an allowance for the inefficiency of labor, because the actual cost of putting a tie in the track, for example, was increased by more than the increased cost of the tie itself and the wage increase. The claims are much more complicated than this when it comes to maintenance of equipment.

The Railroad Administration has estimated on the basis of the claims already filed by the railroads that their total claims will amount to \$1,250,000,000, of which \$700,000,000 to \$800,000,000 is for undermaintenance, and most of this represents the difference between the roads and the Railroad Administration on the interpretation of the contract. The same question is the principal cause of delay in settling the railroad claims for the six months' guaranty period and the difference in interpretation of the maintenance contract for that period is said to represent about \$300,000,000. The commission has already certified partial payments on account of the guaranty amounting to about \$430,000,000.

Claims for Undermaintenance

The railroads have worked out an elaborate and complicated formula for calculating their claims for undermaintenance, which requires a great deal of time for the preparation of a claim and also would involve a correspondingly long time for the Railroad Administration to check it. Therefore, most of the larger roads have not yet presented their full claims and most of those that have made early settlements have had to settle practically on the administration's theory. It is understood that some of these roads consider that they have received some allowance for undermaintenance, but the amount can not be distinguished in the lump sum settlements. The Railroad Administration is willing to admit that there was some shortage of maintenance such as ties, rails and ballast, which should be compensated for, but it adheres to its theory of paying for them on the basis of "price" rather than of "cost" and will not accept the railroad theory without a court decision and as it naturally considers it necessary to check the claims in detail it would require some time to get a final adjudication.

For the six months' guaranty period the Interstate Commerce Commission is the arbiter as to the amount which the railroads may charge against the government for maintenance. If a road during the six months' period spent more for maintenance than the commission finds was necessary to maintain the standard of the test period the excess is at the expense of the company.

I. C. C. and Railroad Administration

Apparently Do Not Agree

Apparently the commission and the Railroad Administration do not agree as to the method of calculating this amount. The commission has not yet issued its ruling on the subject, which is one reason for the delay in settling the guaranty, but Director Colston of the Bureau of Finance has adopted a set of tentative principles which he outlined in an address

before the Railway Accounting Officers Association (*Railway Age*, June 17, page 1403) which in general agrees with the contention of the carriers and it is reported that the commissioners have tentatively approved these principles in general by a vote of 6 to 5.

The commission's decision on this point, however, will not be binding upon the Railroad Administration for the federal control period, although it might encourage the railroads to expect a decision in their favor from the courts, and it would not tend to expedite their settlements with the Railroad Administration. The Interstate Commerce Commission does not have to worry particularly where the money is coming from to pay whatever it decides is due the roads for the guaranty period because the guaranty is payable on the commission's certificate, from an open appropriation, that is, from any funds in the Treasury, otherwise unappropriated, while the Railroad Administration has to get any additional money it needs from Congress by way of a special appropriation. Even if it were inclined to allow the theory of the carriers, it would have to defend its action before a Congressional committee and to convince the committee before getting the appropriation desired. It naturally, therefore, wants to have good proof for any claim that it allows, and it claims to have already saved the government some \$60,000,000 by checking the railroad claims for errors.

A good many people in Washington believe that some of the railroads are filing excessive claims, either as a result of haste in trying to prepare them or in the belief that they will have to trade away a large percentage anyway to get a settlement. It is understood that one large system has a claim of \$75,000,000 for maintenance or at the rate of some \$7,500 per mile after the Railroad Administration had spent about twice as much on its property as the same officers had spent on the average during the test period.

Root of Trouble Deeper Than Freight Rates

For some time the administration seemed to be actuated by the opinion that the principal cause of the business depression was the high freight rates and that business could be stimulated and the condition of the railroads consequently improved by a reduction of rates. A more intensive study has apparently shown that the root of the trouble is far deeper than that and the present idea seems to be that what is needed is something to stimulate buying and that if the railroads themselves, as large purchasers, can be brought back into the market a great deal will have been done to increase business generally, which will in turn improve the condition of the railroads and make possible later a restoration of rates more nearly normal. For this reason the President would like to see the railroads receive promptly the money that is due them and it is understood that he looked very favorably upon the proposal to fund the capital expenditures charged against the railroads for the federal control period until he learned that, as these amounts have been offset by the Railroad Administration against the sums it owes the railroads, a large appropriation would be required to enable the Railroad Administration to pay the roads in full. In view of the campaign to reduce government expenditures, the President is naturally very reluctant to ask Congress for a very large appropriation but neither the prospect of a return to normalcy or the record of the Republican party would be at all improved by a series of railroad receiverships and if the railroads could be induced to abate their claims the amount of the appropriation required to settle would be so reduced that he might be willing to ask for the money.

If the funding plan is adopted, the government would accept railroad securities for the additions and betterments instead of deducting them from the amounts it owes the roads. The Railroad Administration has been making some payments to the railroads on account.

The net amount due the railroads from the government on May 24 was approximately \$600,000,000, according to an estimate prepared by Julius H. Parmelee, director of the Bureau of Railway Economics, and incorporated in a letter to L. F. Loree, president of the Delaware & Hudson. This amount includes an estimate of \$383,000,000 for the period of federal control and a balance of approximately \$229,000,000 still to be paid for the guaranty period following the return of the carriers to their own management.

Mr. Parmelee's letter says in part:

"The director general estimates that the total claims of the railways against the Railroad Administration will aggregate a little more than \$1,250,000,000. He states that the 44 creditor roads whose accounts with the Railroad Administration have already been settled were allowed in final settlement 43.68 per cent of the amount claimed.

"Three debtor roads, having claims amounting to \$27,000,000, were disposed of by funding on account of additions and betterments to the amount of \$6,800,000. That is, final settlement has been made with 47 roads. The total claims of these roads amounted to \$124,040,867, of which \$35,486,914, or 28.61 per cent, was allowed by the Railroad Administration. Applying this percentage to the total estimated amount of the claims against the Railroad Administration (\$1,250,000,000) it would appear that the Railroad Administration will owe the railroads, above and beyond offsets, approximately \$358,000,000.

"In addition to this \$358,000,000 there is also owed an approximate amount of \$25,000,000 to the short line railroads. This makes a total net debt of the Railroad Administration to the railways of approximately \$383,000,000.

"With reference to the guaranty period the standard return of the roads accepting the guarantee amounted to approximately \$431,000,000. The net railway operating income of these roads for this period was a deficit of \$201,000,000, so there is due from the government approximately \$632,000,000. Of this amount \$403,000,000 has been paid by the treasury up to May 24, leaving a balance due the railways of \$229,000,000.

"It is impossible to obtain exact and definite information as to the actual financial status of the railways and the government as the Railroad Administration and the Interstate Commerce Commission have to this date definitely settled only a relatively small portion of the amounts claimed by both the railway and the government. The foregoing figures, although the most comprehensive and accurate that could be obtained, can be considered at best but rough approximations of the existing situation. There are, in all probability, additional items on both sides which the above estimate does not take into consideration and on this basis it seems logical to conclude that the net amount due the railways from the government is somewhere between \$575,000,000 and \$600,000,000."

T. De Witt Cuyler, Alfred P. Thom, Hale Holden, Howard Elliott, Daniel Willard, Samuel Rea, R. S. Lovett, E. N. Brown and S. T. Bledsoe, members of the steering committee of the Association of Railway Executives, called on the President on Wednesday at his invitation and discussed the entire question of the settlement of the accounts and the funding proposition. No announcement was made of any definite conclusions, but the matter was to be further discussed at a meeting of the executives in New York on Friday.

A TABULATION of 40,804 answers to a questionnaire sent out by the American Farm Bureau Federation to farmers, shows that 96.9 per cent of the farmers believe they will be able "to move a materially larger amount of agricultural products" if a reduction on freight rates is secured. The returns are complete from five states and incomplete returns were received from six other states

Signs of the Times in the American Railroad World*

Discriminating Review by a Prominent Operating Officer—Thinks
the Corner Has Been Turned

By Elisha Lee

Vice-President of the Pennsylvania Railroad

THE RAILROADS of the United States have cost \$20,000,000,000 and are mortgaged for less than \$10,000,000,000. A man who has helped someone else build a home or a factory by lending the owner half of its original cost and taking a mortgage for security is commonly looked upon as having made a very safe and sure investment; and the legal and moral obligation of the borrower to repay is held to be of the highest order. Any action, governmental or otherwise, calculated to impair his ability to fulfill that duty would be justly and universally resented and condemned. Is the man who has lent his savings to help build a railroad any less deserving of fair treatment? Are the property investment accounts of the railroads, collectively, free from inflation? These accounts have been kept since 1907 under the direct supervision of the Interstate Commerce Commission, and upon a uniform system for all roads. In determining value for rate-making last summer, the Commission accepted practically the maximum sum claimed by the railroads, as appearing upon their books—a remarkable testimony to the reliability of these figures, in view of the Commission's extreme conservatism and the certainty that any utterance favoring the roads would lay the Commission open to immediate and severe political attack. The pending physical valuation of the railroads is pretty sure to show a present worth for the railroads as a whole substantially in excess not only of their capitalization, but of their combined property investment accounts.

Three Deceptive Phrases

"Watered stock" is one of three widely circulated and glibly repeated phrases that have done the railroads incalculable and unmerited harm. The other two are, "The public be damned" and "What the traffic will bear." The former was a hideous error if ever uttered by a responsible railroad executive. The latter is a clumsy expression of a perfectly sound economic principle: that the total expenses of railroad operation must be apportioned among the articles shipped, with due regard to the proportion of the total cost which each is commercially able to bear.

It is interesting, although not exhilarating, to speculate on the losses which railroad investors have suffered through the misuse, misunderstanding, misquotation and misapplication of these three phrases, but such considerations would lead far afield from the subject we are discussing. There have regrettably been a few cases in which railroad securities have been issued to represent not physical property but prospective or anticipated earning power. I have no desire to appear as an apologist for such practices, but their extent and relative importance have been grossly exaggerated.

Among those who have notably suffered in this respect have been the holders of Pennsylvania Railroad stock who not only paid in more than \$40,000,000 in cash premiums above par value, but have, in the more prosperous past, reinvested in their property, without adding to the capitalization, far larger sums out of net earnings which legally and morally might have been distributed as dividends. It is more than conservative to say that for every dollar of Pennsylvania Railroad stock there are at least two dollars' worth

of equity in tangible property over and above indebtedness, yet Pennsylvania stock is sold today at a depreciation of one-third its par value; and the directors have had no choice but to reduce for the time at least the long-established and moderate dividend of six per cent. The bondholders, too, have suffered with the stockholders through the declining market value of their securities. These injustices reflect in no small measure the effects of the false propaganda which has long been carried on to create the impression that railroad securities as a whole are watered.

In the hearings before the Railroad Labor Board, one of the chief representatives of the labor organizations a few weeks ago presented a list of security issues purporting to show altogether \$500,000,000 of railroad over-capitalization. The representative who submitted the list was one of the most resourceful, highly skilled and highly paid of the labor advocates and we may assume that the list was as good and impressive a one as ingenuity could compile. It went to the public, of course, without any analysis or adequate explanation of its significance. If it left any impression at all in the public mind it was merely a general one of the existence of a large amount of fictitious capitalization; and that, doubtless, was just the impression it was intended to leave. Nothing was said of the fact that the \$500,000,000—even if every penny was correct—represented only about 3 per cent of the total net capitalization of the railroads; nor was attention directed to the fact that the under-capitalization in one single railroad system [the Pennsylvania] would wipe out all the water which the labor representative succeeded in finding in others. It is a fact that there has been invested in the Pennsylvania Railroad system about a half billion dollars more than its net outstanding capitalization.

In all substantial, well-planned railroad systems the supposed over-capitalization will be found to be totally without foundation. You may look over all the balance sheets you please and you will not find any items covering patents or good will or other unrealizable assets. Railroad property is represented by "road and equipment" and its existence is verifiable by the eye.

Stability of Railroad Investments

Many railroad bonds have long periods to run. Some have been drawn to mature in a century. Have their holders any reason to fear that the railroads are in danger of being superseded by other forms of transportation and their security value thus impaired? My judgment is that we have no cause to prepare against such a contingency, either for ourselves or our dependents. The motor car and the aeroplane are more likely to develop new transportation fields of their own, rather than extensively to invade those of the railroads. The telephone did not wipe out the telegraph; typewriters have not eliminated pens and pencils. Think of the great development of rail transportation; and yet we are greater road builders than were even the Romans of antiquity. Indeed, the permanence of human institutions, once well established, is one of the most interesting phenomena of history. It seems to be a sort of general law of progress that new developments in any useful art or field of endeavor, instead of crowding out the old, often

*Abstract of an address before the Philadelphia Bond Men's Club, at Philadelphia, June 14.

tend rather to create entirely new fields of usefulness for themselves. To the extent to which motor cars are likely to take over the short-haul freight traffic, the railroads will probably be immediately benefited financially, because short-haul business is becoming increasingly unremunerative on account of the high proportion of terminal costs which it must sustain. Altogether, I am not afraid of motor cars and aeroplanes making railroads obsolete.

I think we are justified in three general conclusions regarding the funded debt of railroads: 1. Outstanding railroad bonds as a whole represent the real investment of real money; 2. They are secured by property worth more than double their face value; 3. The property so pledged may be counted upon to retain its practical value and utility indefinitely. The owners of railroad bonds may justly claim not only the highest conceivable legal but also moral right to expect that the integrity of their investments will be fully protected. The elder J. P. Morgan said that "Character is the best collateral." The fact that the moral character of the American people is the highest in the world appears to me as one of the most dependable and substantial safeguards which railroad investors have, because it must be remembered that under the system of public regulation which has developed in this country, particularly now that its fields extend not only to rates but to wages, the final moral responsibility for the integrity of railroad investments rests with the people as a whole. Most of what I have said applies just as aptly to the stockholders of the railroads as to the bondholders. * * * We must bring about a very different relationship between income and outgo from that which has prevailed in recent years.

The Outlook

I cannot help feeling that the corner has been turned, and that we can begin to discern something which has at least the appearance of daylight ahead. The Labor Board realizes that substantial downward adjustment is necessary. Its action with respect to the national agreements constitutes a clear recognition of their economic unsoundness. President Harding believes in a fair deal for the railroads and is not afraid to say so. There is a growing friendly and constructive attitude in Congress, particularly exemplified in the present helpful Senate inquiry. Back of all of this and more fundamental in its nature lies the really remarkable change which has taken place in public sentiment toward the railroads. I think it very questionable whether at any time within the last decade it has been really popular to "bait" the railroads, though the volubility of an organized minority may have misled those who have been courting popularity. The press and public were almost unanimous in their condemnation of the Adamson Law of 1916, upon the enactment of which many persons lay the original blame for the subsequent wage and labor troubles of the railroads. Had Congress submitted the Adamson Law to popular referendum it is as near a certainty as anything can be that it would never have gone into effect. Country-wide questionnaires have shown over 80 per cent of the people favoring a return to private ownership and against a continuance of government ownership as a permanent policy.

Since the return of the railroads to their owners the press and people are overwhelmingly for fair treatment of the railroads; for a liberal adjustment of their claims for deterioration sustained while they were being used for war purposes; for prompt payment of the remaining balances of the government guarantees; for funding of their indebtedness on account of permanent investments made by the government during federal control; for complete abrogation of the national agreements; and for a readjustment of railroad wages to reasonable levels. The public has become educated. It realizes that in the end it pays all the costs of railroad operation, including every unnecessary dollar spent as a result of unduly high wages, full crew laws or other uneco-

nomie conditions. And the effect of public sentiment on political action affecting the railroads has not as yet exerted its full force.

The railroads are not seeking additional legislation. The Transportation Act of 1920 is no doubt capable of amendment, but for the present I believe that the law as it stands should receive a more extended trial. Those who blame the business depression on railroad rates forget that it is a world-wide condition, much less severe in this country than in Europe. With respect to railroad wages, we feel that the Labor Board has not ordered as great a reduction as it will be found the circumstances demand, and there is little doubt that conditions will inevitably bring this subject before the Board again. The United States is too big and its population too diversified to have wages and working conditions alike in all parts, and it has never been attempted in any important industry except railroading. If each individual company had clear and unequivocal authority to negotiate wages and working conditions directly with its own employes, half the battle would be won. A large part of our trouble has been due to the belief that legislation or other governmental action can reverse the functioning of economic laws.

In the rawer days of the West it came to the notice of a law-maker in one of the Trans-Mississippi commonwealths that arithmetic was sometimes made troublesome by the fact that the ratio of the circumference of a circle to its diameter can never be expressed exactly either in decimals or common fractions. To get rid of this annoyance, he is said to have introduced a bill decreeing that thenceforth the ratio should be exactly as three is to one. The bill, I believe, was defeated; but it may possibly have provided Mr. Bryan with his inspiration when some years later he sought to revise by Act of Congress the exchange values of gold and silver. Railroad legislation should conform to, and not seek to overthrow, economic law. There will for a long time be abundant need for us to "watch our step," but I think reasons are not wanting to justify a thoughtful man in taking a hopeful view of what is ahead.



Photo by Keystone

Victoria Station, Bombay, India

Scope of Wage Reduction Extended in New Order

Labor Board Makes 92 Carriers Party to Decision 147—National Agreements Continued Temporarily

THE RAILROAD LABOR BOARD on June 27 added 92 carriers and one labor organization as parties to its wage reduction order, Decision No. 147, an abstract of which appeared in the *Railway Age* of June 3 (page 1259). The 12 per cent wage cut decrease now applies to practically all of the larger carriers and all classes of employees and will result, according to the Board, in cutting off approximately \$400,000,000 from the annual pay roll.

Several sections of Decision No. 147 have been enlarged to cover wage reductions for certain workers not specifically noted before. Article X of Decision No. 147 pertaining to floating equipment employees has been enlarged so that the rates of pay in various ports such as New York, Philadelphia, Pa., Hampton Roads, New Orleans, La., Natchez, Miss., Cairo, Ill., St. Louis, Mo., and Duluth, Minn., are fixed according to the conditions prevailing at each point. The rates fixed are highest at Duluth and lowest at St. Louis, the range in the rates between these points being approximately \$60 per month.

Article XII of Decision No. 147 was also enlarged by the addition of the following provisions:

For the specific classes of employees listed in the following sections of this article, and named or referred to in connection with a carrier affected by this decision, deduct from the amount of increases granted since February 29, 1920, the following per cent of such increases:

Sec. 3. Chefs in bridge and building department and chefs in extra gangs.....60 per cent.

Sec. 4. (a) *Restaurants*.—Managers, assistant managers, cashiers, head waiters and head waitresses, waiters and waitresses, bus boys and scrub girls, chefs, cooks, bakers, dishwashers, yardmen, carvers and cold-meat men, vegetable man, storeroom man, linenroom man, pantry men and pantry girls, lunch-counter clerk, houseman, housekeeper, maids and porters.....60 per cent.

(b) *Dining cars*.—Stewards, chefs, cooks, waiters, and buffet porters.....60 per cent.

(c) *Laundry Workers*.—Washmen, assistant washmen, foreladies, seamstresses, body ironers and manglers.....60 per cent.

Sec. 5. Cooks in maintenance of way department.....60 per cent.

Sec. 6. Cooks and campmen in extra gangs, cooks in carpenter gangs, and cooks in Russellton Hotel.....60 per cent.

Sec. 7. Dining car stewards.....60 per cent.

Sec. 8. Stewards, cooks, waiters, and porters.....60 per cent.

Sec. 9. (a) *Restaurants and Hotels*.—Stewards, managers, chefs, cooks, dishwashers, pantry men, waiters, porters, bedmakers, and barbers.....60 per cent.

(b) *Ferry Restaurants*.—Stewards, chefs, cooks, waiters, porters, and dishwashers.....60 per cent.

(c) *Dining Cars*.—Stewards, chefs, cooks, pantry men, waiters, bus boys, and cabinet, buffet, and chair car porters.....60 per cent.

(d) *Miscellaneous*.—Commissary helpers, laundry workers, and chauffeurs.....60 per cent.

Sec. 10. (a) *Restaurants*.—Managers, cooks, waiters, maids, and porters.....60 per cent.

(b) *Dining Cars*.—Cooks and waiters.....60 per cent.

Sec. 11. Stewards, chefs, cooks, pantry men and waiters.....60 per cent.

Sec. 12. Waitresses, parlor car chefs, and porters.....60 per cent.

Many Disputes Over National

Agreements Reach Board

The Labor Board during the past week has been flooded with the submission of controversies over rules and working conditions. The character of the submissions made to the Board indicates very clearly that the employees on the majority of roads have submitted the terms of their national agreements as practically the "irreducible minimum" and stood flatly for the perpetuation of the punitive and restrictive clauses against which the railroads have strenuously ob-

jected. In a few cases, particularly those in which smaller roads are concerned, the submissions to the Board indicate that there has been an attempt to negotiate and in these cases the points in controversy are comparatively few.

Employees Take Referendum on Wage Cuts

The employees' organizations affected by Decision 147 have been taking referendums during the past week, the results of which are to be announced when the general chairmen of the various organizations meet in Chicago on July 1. Labor leaders have consistently declined to comment on the trend of the voting. However, the press has reported that the returns already in indicate a disinclination to accept the wage cuts ordered by the Labor Board. On June 28 it was reported unofficially that the shop men, first of the organizations to complete its vote, had rejected the Board's ruling by a large vote.

Labor Board Continues National Agreements

and Temporarily Ends Punitive Overtime

The Labor Board on June 28 issued a "surprise" order continuing all National Agreements "until such time as such rules are considered and decided by the Labor Board" and ending temporarily the payment of time and one-half for overtime until this point in the controversy between the carriers and their employees is decided by the Board. Overtime in the meantime is to be paid at the pro-rata rates except on those carriers where overtime was paid for at punitive rates prior to federal control.

The Board's order, issued as an addendum to Decision No. 119, said:

Reports of the results of conferences held in accordance with the directions contained in Decision 119 have been and are now being received in considerable number. In some instances the carriers and the employees have arrived at an agreement upon all rules. In a considerable number of instances there remain certain rules upon which no agreement has been reached, while in others conferences have not as yet been begun. Under these circumstances, in order that no misunderstanding may exist or unnecessary controversy arise, it appears necessary, purely as a *modus vivendi*, that the Labor Board establish a uniform policy to be pursued with regard to the undecided rules until such time as it is possible to make a decision.

In the available reports from the conferences held in accordance with the direction contained in Decision 119, it is found that the principal rules still the subject of dispute are those governing payment of overtime. The Labor Board directs as follows, effective July 1, 1921, with the understanding that if the rules promulgated by the Labor Board to be effective July 1 are more favorable to the employees, adjustment in compensation due the employees will be made by the carrier:

1. All overtime in excess of the established hours of service shall be paid for at the pro rata rate, provided that this will not affect classes of employees on any carrier which have reached an agreement as to overtime rates, nor to classes of employees on any carrier who by agreement or practice were receiving a rate higher than pro rata prior to the promulgation of any general order of the United States Railroad Administration relating to wages and working conditions. Inasmuch as this Board has not as yet given consideration to any dispute on overtime rates, this order should not be construed to indicate the final action and decision of the Labor Board on disputes as to overtime rates which have been or may be referred to the Board.
2. In lieu of any other rules not agreed to in the conferences held under Decision 119, the rules established by or under the authority of the United States Railroad Administration are continued in effect until such time as such rules are considered and decided by the Labor Board.
3. This direction shall not be understood to modify Decision 119

- in any respect other than is specifically provided for herein.
4. Rules agreed upon by carriers and employees to be effective as of July 1.

Employees in General Offices

Another interpretation of decision 119 was handed down by the Labor Board on June 29, ruling that agreements as to working conditions of employees in the general offices should not be separate from the agreements negotiated with the Brotherhood of Railroad and Steamship Clerks, Freight Handlers, Express and Station Employees. In the negotiations now taking place under decision 119, several disagreements have resulted over the question of the right of the employees in the general offices to negotiate their own agreement independently of the clerks' organization, where this organization represents the majority of all clerks and station employees in the service of the carrier, but not the majority of the general office force. On one carrier the general office force expressed a desire not to be included in the agreement under negotiations between the clerks' organization and the carrier and asked permission of the board to negotiate a separate agreement. The question was referred to the board by the employees and the carrier, the latter favoring such separation on the ground that the general office force is a separate class.

The Labor Board, in its decision, recognized the difference in the character of work performed by the clerks in the general offices, but ruled that but one agreement should be made in which could be incorporated the exceptions in which the general office forces would be included.

The decision of the Board, however, ruled that the employees in the general offices do not constitute a class and, therefore, but one agreement should be made. It added, "This decision will not operate to prevent the exclusion of the personal office force and the confidential positions in the general offices from the application of the agreement."

The Pennsylvania and Its Employees

NOTICE has been given to the United States Railroad Labor Board that the Pennsylvania Railroad and the representatives of its employees in engine and train service have mutually agreed on regulations and working conditions. These enginemen, firemen, hostlers, conductors, trainmen and switch-tenders, number more than 40,000. Heretofore the men in engine and train service have been working under two different schedules, one for the former lines east and one for the former lines west. The successful outcome of these negotiations is a source of gratification to the Pennsylvania officers, who are endeavoring to establish similar arrangements for employees in other branches of the service, not only for the negotiation of regulations to take the place of the so-called national agreements but also for the amicable settlement of all matters of controversy that may arise.

E. T. Whiter, assistant to the vice-president in charge of personnel, in an address before the Manufacturers' Club at Philadelphia on June 29, discussed at length the labor problems now engaging the attention of railroads and their employees everywhere, and gave interesting data concerning the Pennsylvania. He said in part:

Under the decision of the Labor Board we have asked our employees to select, by secret ballot, representatives from among their own number in each of the various classes, representatives of their own selection, to speak for them in negotiations with the management. We have, already, the "Joint Reviewing Committee of the Pennsylvania System," established early in January of this year, with representatives of the engine and train service, which deals with about 50,000 employees. It has been in operation now for six

months, and the record of its work is one of which not only the management but the men themselves are very proud. It has actually demonstrated what we have been contending for before the Labor Board, namely, that it is possible, if we are permitted to do so, to get together with our own men and to settle our own affairs within the family.

That is what we have in mind for all other classes of employees. We have absolutely no quarrel with the unions. Nothing could be farther from the truth than any statement that the Pennsylvania, in proposing this plan to its employees, is trying to disrupt labor organizations. There are about 185,000 persons now employed on the Pennsylvania System, of whom between 165,000 and 170,000 have been involved in the present controversy. Of these, about 40,000 are in the train service and they have mutually agreed with the company on working conditions.

A majority of the shop employees at Altoona have also agreed on fundamentals, including piece-work, and negotiations between those men and the company are continuing with every prospect of a mutually satisfactory arrangement being consummated. The maintenance of way employees are now voting. The signalmen, the clerks, the telegraphers, and the freight handlers have taken their vote, making in all a total of about 100,000 that have either completed their negotiations or are now choosing their representatives.

Outside of Altoona, a majority of the shop crafts have declined to vote, and the management feels that it can assume no other course than to deal with the committee chosen by those who did vote. Many of the foremen have announced that they consider themselves officers and do not want a committee to represent them.

We have not been blind to the difficulties that obstruct our way, but we feel that, from the result of the voting, substantial progress has been made. We earnestly request co-operation on the part of the public generally in our efforts to reach a basis of harmonious relationship with our employees. Notwithstanding our endeavors, the Labor Board and the public will have this problem before them for some time to come, unless the American public is determined that these national agreements, or schedules based upon the principles of the national agreements, shall not continue to be imposed upon the railroads under some other form. * * * There is an evident disposition on the part of railroad managers, as well as employers in other industries, to recognize the employee as a factor in industry and to treat him fairly; and insofar as there is a spirit of friendliness and co-operation between employers and employees, the country will prosper.

The American Federation of Labor at Denver has just re-affirmed its stand for government ownership of railroads with democratic operation. That means the Plumb Plan. The executive council was instructed to draw up proposed legislation giving railroad workers equal rights and privileges with capital. If their efforts should prove successful, it is only a short step farther to include all industries organized under corporate grants, and again only another step to include all the basic industries, such as coal, iron, steel and perhaps others. Such resolutions are not idle words. They should not be treated lightly. They call for most serious consideration on the part of business men. Railroad managers are trying to operate their properties honestly, efficiently and economically, and have set for themselves a high standard of public service; but they need your support.

NEW ENGLAND must have adequate service from its transportation system, at reasonable rates, or the prosperity of millions of Americans will be imperilled. This was the main point of an address by Vice-president Calvin Coolidge in New York City on June 27. The speaker intimated that this question deserved the serious attention of some railroads outside of New England.



Waiting to Take an Express Train Over the Mountains

Heavy Locomotives for the Southern Pacific

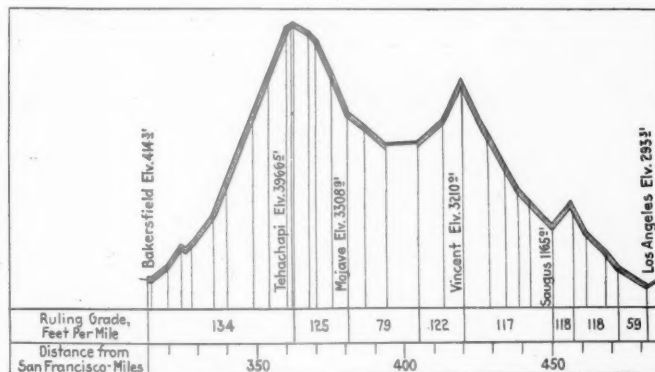
Pacific Type Handles 11 Passenger Cars on 1.5 Per Cent Grade—
New Santa Fe Type Increases Tonnage

DURING the early part of the year, the Southern Pacific received from the Baldwin Locomotive Works 15 locomotives each of the 4-6-2 and 2-10-2 types. The 4-6-2 type was built particularly for use on heavy passenger trains between Ogden, Utah, and Carlin, Nev.; and the 2-10-2 type on heavy freight trains between Los Angeles, Calif., and Bakersfield.

Between Ogden and Carlin, a distance of 247 miles, the maximum grade is 1.5 per cent, 10 miles of which is encountered going east, and 20 miles going west, the remaining grades varying from 0.15 per cent to 0.6 per cent. These 4-6-2 type locomotives are capable of handling on this district, without helper service, a passenger train consisting of 11 cars, including Pullman cars, which weighs 875 tons. Locomotives of the lighter design of the 4-6-2 type, which the new locomotives displace, require helpers when going west from Montello to Valley Pass and from Wells to Moor going east.

Between Los Angeles and Bakersfield, a distance of 171 miles, there are 64 miles over grades of from 2.2 per cent to 2.37 per cent going west, and 73 miles over grades of from 2.23 per cent to 2.54 per cent going east, the remaining grades varying from 1.0 per cent to 1.5 per cent. The tonnage hauled by these 2-10-2 type locomotives is 1,005 tons going west, and 865 tons going east, or about 13 per cent over that handled by the former lighter 2-10-2 type locomotives.

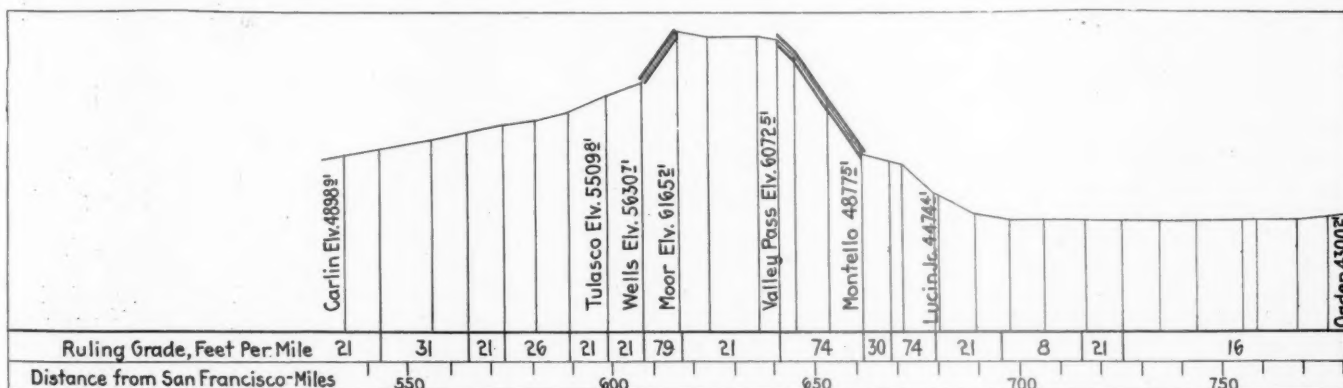
The specifications and general designs for these locomotives were worked up under the supervision of George McCormick, general superintendent of motive power, and F. E.



Profile of Road Between Bakersfield, Calif., and Los Angeles

Russell, assistant mechanical engineer, the designs being completed and details worked out by the builders.

The 4-6-2 type locomotives have a rated tractive effort of 43,660 lb., with 180,000 lb. on drivers, the ratio of adhesion being 4.12. The total equivalent heating surface is 4,605 sq.

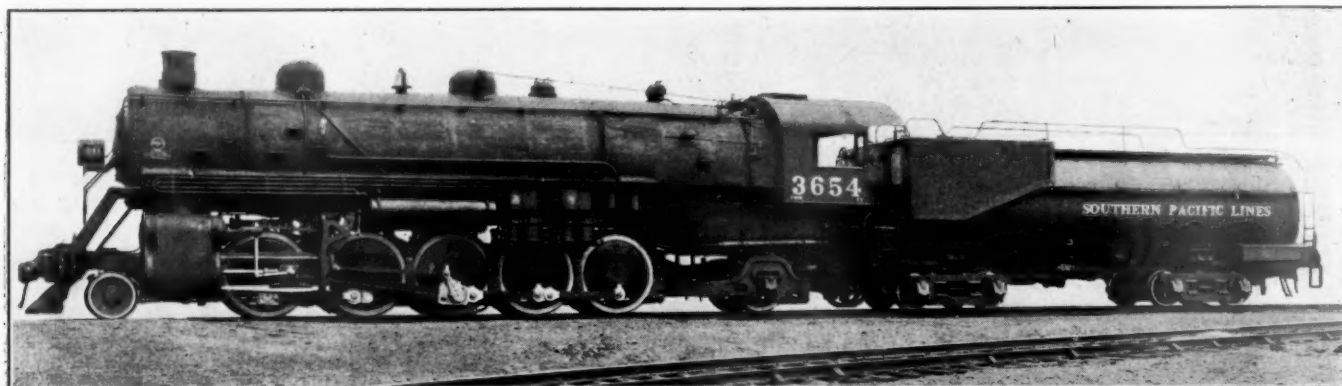


Profile of Road Between Carlin, Nev., and Ogden, Utah

ft., or 1 sq. ft. for each 9.5 lb. of tractive effort, this ratio indicating good steaming capacity. The boiler is of the extended wagontop type with a wide firebox placed back of the drivers and over the rear trucks. A combustion chamber 3 ft. long extends forward into the boiler barrel, and the tubes have a length of 18 ft. The superheater consists of 40 units and has a superheating surface of 836 sq. ft. The cylinders have a stroke of 30 in., which is a departure from the usual practice in passenger locomotive design. The long stroke was based on the results of numerous tests of locomotives

6,933 sq. ft., or 1 sq. ft. for each 10.8 lb. of tractive effort, this ratio likewise indicating excellent steaming capacity. The boiler is of the straight top type with a firebox 90 in. wide placed over the rear truck. The combustion chamber is 5 ft. 4 in. long, and the tubes have a length of 21 ft. The cylinders have a stroke of 32 in. and lateral motion driving boxes are provided on the first pair of drivers.

Among the specialties applied to both types of these locomotives are Commonwealth cast steel tender frames, four-wheel equalizing swing motion tender trucks, Delta type



Santa Fe Type Locomotive for Handling 1,000 Tons on 2.4 Per Cent Grades

with superheaters made by the Southern Pacific, which justified the use of the longer stroke with superheated steam. The performance of these 4-6-2 type locomotives since going into service has proved that no mistake was made in adopting a longer stroke for passenger locomotives.

The 2-10-2 type locomotives have a rated tractive effort of 75,150 lb., with 297,300 lb. on drivers, the ratio of adhesion being 3.96. The total equivalent heating surface is

trailing truck frames, radial buffers, Unit type safety bars, Ragonnet power reverse gears, extended main driving boxes and Nathan non-lifting injectors. A complete installation of F.B.C. flexible staybolts is made in the breaking zone of the firebox and in the combustion chamber around the belly of the boiler.

Both types are oil burners and are equipped with Walschaert valve gear with the link block in the bottom of the

	4-6-2 Type locomotives		2-10-2 Type locomotives	
	1912	1921	1917-19	1921
Date built.....	29,920 lb.	43,660 lb.	63,300 lb.	75,150 lb.
Tractive effort	22 in. by 28 in.	25 in. by 30 in.	27½ in. by 32 in.	29½ in. by 32 in.
Cylinders				
Weights:				
Total engine	220,900 lb.	297,800 lb.	348,000 lb.	385,900 lb.
On driving wheels.....	141,400 lb.	180,000 lb.	273,000 lb.	297,300 lb.
On leading truck.....	38,000 lb.	59,700 lb.	29,000 lb.	29,800 lb.
On trailing truck.....	41,500 lb.	58,100 lb.	46,000 lb.	58,800 lb.
Engine and tender.....	359,000 lb.	519,800 lb.	521,460 lb.	607,900 lb.
Wheel base, driving.....	13 ft. 4 in.	13 ft.	22 ft. 6 in.	22 ft. 10 in.
Wheel base, total.....	33 ft. 4 in.	35 ft. 6 in.	41 ft. 6 in.	42 ft. 4 in.
Wheel base, engine and tender.....	63 ft. ¼ in.	75 ft. 9½ in.	80 ft. 2½ in.	82 ft. 7½ in.
Ratios:				
Weight on drivers, tractive effort.....	4.72	4.12	4.18	3.96
Equivalent heating surface*—Grate area.....	72.3	65.4	93.8	84.1
Per cent firebox heating surface to evaporative surface.....	6.34	8.41	7.34	7.79
Per cent superheating surface to evaporative surface.....	20.25	24.95	21.8	23.6
Total evaporative surface—Volume of cylinders.....	222.8	196.7	202.5	202.4
Wheels:				
Driving, diameter over tires.....	77½ in.	73½ in.	63½ in.	63½ in.
Driving, thickness of tires.....	3¼ in.	3¼ in.	3¼ in.	3¼ in.
Driving journals, main.....	10 in. by 12 in.	12 in. by 22 in.	12 in. by 22 in.	13 in. by 22 in.
Driving journals, front.....	9 in. by 12 in.	11 in. by 13 in.	10 in. by 20 in.	11 in. by 20 in.
Driving journals, others.....	9 in. by 12 in.	11 in. by 13 in.	10 in. by 13 in.	11 in. by 13 in.
Engine truck wheels, diameter.....	33 in.	36 in.	33 in.	33 in.
Engine truck journals.....	6 in. by 10 in.	7 in. by 12 in.	6 in. by 12 in.	6 in. by 12 in.
Trailing truck wheels, diameter.....	45½ in.	51½ in.	45½ in.	45½ in.
Trailing truck journals.....	8 in. by 14 in.	9 in. by 14 in.	8 in. by 14 in.	9 in. by 14 in.
Boiler:				
Style	Straight Top	Ext. Wagontop	Ext. Wagontop	Straight Top
Working pressure	200 lb.	200 lb.	200 lb.	200 lb.
Outside diameter, first ring.....	70 in.	78 in.	82½ in.	90 in.
Firebox, length and width.....	108 in. by 66 in.	120¾ in. by 84 in.	120½ in. by 75¼ in.	132 in. by 90 in.
Tubes	182—2 in.	193—2½ in.	279—2 in.	261—2½ in.
Flues	24—5½ in.	40—5½ in.	40—5½ in.	50—5½ in.
Tubes and flues, length.....	20 ft.	18 ft.	20 ft. 6 in.	21 ft.
Heating surface, tubes and flues.....	2,571 sq. ft.	3,069 sq. ft.	4,130 sq. ft.	4,722 sq. ft.
Heating surface, firebox.....	174 sq. ft.	282 sq. ft.	327 sq. ft.	399 sq. ft.
Evaporating heating surface, total.....	2,745 sq. ft.	3,351 sq. ft.	4,457 sq. ft.	5,121 sq. ft.
Superheating surface.....	556 sq. ft.	836 sq. ft.	972 sq. ft.	1,208 sq. ft.
Equivalent heating surface,* total.....	3,579 sq. ft.	4,605 sq. ft.	5,915 sq. ft.	6,933 sq. ft.
Grate area	49.5 sq. ft.	70.4 sq. ft.	63 sq. ft.	82.5 sq. ft.
Tender:				
Tank	Cylindrical	Cylindrical	Cylindrical	Cylindrical
Water capacity	7,000 gal.	12,000 gal.	12,030 gal.	12,000 gal.
Oil capacity	2,940 gal.	4,000 gal.	3,120 gal.	4,000 gal.

*Equivalent heating surface equals total evaporating heating surface plus 1.5 times the superheating surface.

link in forward motion, the gear being so arranged as to give equal cut-off at 55 per cent of the stroke. The lead is $\frac{1}{4}$ in., lap $1\frac{1}{4}$ in., exhaust clearance $\frac{1}{8}$ in., and valve travel for the 4-6-2 type $6\frac{1}{2}$ in. and for the 2-10-2 type, 7 in. These valve events were decided upon from experiments made during the locomotive tests above referred to, proving to be the most efficient of the numerous combinations tried.

The counterbalance is designed to balance only 50 per cent of reciprocating parts and to produce a dynamic augment at diameter speed not exceeding 50 per cent of the static wheel load. The reciprocating parts are very light, the piston heads being of the built-up type with cast iron bull-rings, and the piston rods of open-hearth steel, heat-treated, and hollow bored. The main and side rods are also of very light design, all being of I-section except the side rods on the 2-10-2 type locomotives, which are rectangular. All driving axles and main and forward crank pins are made of open-hearth heat-treated steel, and are also hollow bored. Constant resistance leading trucks are applied to both types of locomotives.

The trailing trucks on the two types of locomotives are interchangeable and are equalized with the drivers by means of equalizing beams which are fulcrumed on the truck frame. With this arrangement, which is a new departure for this type of truck, the load is transferred to the truck frame at the radius bar pin and through two sliding bearings placed on the right and left sides back of the truck wheels. In previous designs the entire weight on the truck was carried on fulcrums between the radius bar pin and the wheels.

The tenders, which are of the Vanderbilt type, are unusually large, having a capacity of 12,000 gal. of water and 4,000 gal. of oil. The tender trucks are of the equalized type with journals $6\frac{1}{2}$ in. by 12 in.

The following tabulation shows the principal dimensions, weights and ratios of the two new types, and, for comparison, of lighter locomotives of the same types which were superseded by the new power between the points mentioned.

Railway Business Association Places Railway Problems Before President

WASHINGTON, D. C.

THE FOLLOWING statement was presented to President Harding at the White House on Monday morning, June 27, by Alba B. Johnson, of Philadelphia, president, and associates speaking for the Railway Business Association, the national organization of concerns selling goods or services to railways:

"The Railway Business Association invites your consideration of two important aspects of the railway problem.

"We refer first to the industrial unemployment. This is aggravated and protracted by inability of the railroads to pay the bills of railway supply manufacturers or to order necessities. Without entering into the causes thereof depletion of railway treasuries is due to delay in reaching an adjustment of railway accounts with the government. Railroad orders being held to the minimum, many plants are on part time or closed down, throwing their forces out of work, while local banks carry manufacturers with credit which would ordinarily be available to other borrowers. Measures for relief are reported by the press to be under official consideration. We earnestly urge that proposed appropriations by Congress to expedite adjustments shall be viewed as the fulfilment of a government obligation. For every sum properly appropriated to stabilize the roads and cognate business the people of the country will realize very much more in prosperity and the government treasury in taxes. Meantime the railroads will be preparing to handle the increased volume of traffic which must be expected in due course.

"Second, we refer to the practice, increasingly prevalent among users of transportation during the present business depression, of carrying their proposals for railway rate changes to executive and legislative officers of the federal government and to the public and press, instead of as heretofore to the carriers and on appeal from them when necessary to the Interstate Commerce Commission.

"Rehabilitation of our railways and subsequently their maintenance and operation will depend upon the foresight and business judgment which are applied to the regulation of rates. The problem must be dealt with as a whole in accordance with a comprehensive program steadily pursued. Such a program can be carried forward in no other way except through concentration of responsibility. The Interstate Commerce Commission is the body to which Congress has delegated the task. The commission can serve the whole country in the long run successfully only if it retains the prestige and esteem to which its quasi-judicial character entitles it. The survival of privately owned and operated railways requires general abstinence from agitation and political pressure in connection with any matter over which the commission has jurisdiction.

"We earnestly deprecate appeals by shippers and travelers to the President, his advisers and to members of Congress for relief which under the statute is to be sought from a quasi-judicial administrative tribunal.

"In our judgment this practice if continued will harm every interest. It will bring misfortune upon the political officers whose intervention is enlisted, because they are rarely either chosen or trained for the regulation of railway rates and are not occupied in its daily study; yet if they intervene and the public believes such intervention to have been influential, they will in case of bad results be held to a responsibility which is no part of their official duty. It will break down the regard in which the Interstate Commerce Commission is held and deprive the country of a trusted and indispensable agency which has required 30 years to develop. Upon users of the railways, consumers of things transported, in other words the whole public, it will inflict calamity, since it will make difficult and embarrassing to the commission the task which Congress has delegated to it and to nobody else, that of planning comprehensively and foresightedly the financial rehabilitation of these carriers through a stable rate policy designed to yield in the average year adequate net income and hence the ability to furnish satisfactory facilities and service.

"The Railway Business Association is, as you well know, composed of manufacturers engaged in supplying the railways with their necessities. Comprising a group of industries which in good times employ as many men and probably as much capital as the railways themselves, our members on behalf of their employees, managers and stockholders are deeply concerned in the increase and stability of railway purchasing power which would stimulate not only our own industries but all industry and general business in the interest of the whole public. We believe the Transportation Act of 1920 makes it possible to put the roads on a firm foundation. We equally believe this purpose can be frustrated if through any mischance the administration of the act shall be deprived of its quasi-judicial character and subjected to the pressure of groups through political agencies.

"During many years before federal control the Interstate Commerce Commission was regarded as judicial or semi-judicial. Its dockets were considered litigation. Testimony and argument were conducted as in a court. Its decisions became precedents. Publicity or other campaigns of agitation were deemed improper, and intervention by political personages not to be thought of.

"Federal control absorbed into the political executive this rate-making function which had previously been quasi-judicial. Citizens acquired the habit of employing the same

approaches in the matter of railway rates and practices to which they were accustomed in matters normally within the executive or legislative scope. Upon the relinquishment of the roads and the resumption of regulation, the commission found that principles which had required years to establish and which had been regarded and treated as settled and applicable without argument had been overturned and the whole process had to be started anew. At the same time shippers continued the war-time habit of political pressure.

"From the complaints of shippers discussed in that way a large part of the public has obtained the impression that the regular mechanism of negotiation with carriers or their committees and of appeal to the commission has broken down. Press dispatches purporting to be based upon the official view express satisfaction with the progress already made by the commission in the amelioration of hardships arising out of the horizontal advances of 1920 but the same articles proceed to characterize such adjustment as a problem confronting the administration. It seems inevitable that such interpretations will confirm the idea that rates are to be made in the light of popular opinion instead of in the light of expert and legally responsible opinion, and further encourage shippers of commodities to make their case with executive and legislative officials and in the newspapers instead of with the commission.

"The Railway Business Association from the beginning of large-scale rate advance cases in 1910 to date has refrained from suggesting rate schedules to the commission. Our steadfast attitude was that of urging the public and business organizations to make clear beforehand their acquiescence in whatever judgment the commission might reach. On March 31, 1921, in annual meeting, our association adopted the following resolution:

"The Interstate Commerce Commission on March 1, 1922, under the statute, acquires authority to fix from time to time the rate of return upon railway property which transportation rates are to be designed to yield. It therefore becomes the duty of the commission to define the purposes for which new capital is desirable. The United States needs a transportation program that looks further ahead than a few months, and a financial program upon which to base the rebuilding program. The Interstate Commerce Commission, entering upon a far-reaching experiment with a given level of rates to see whether it will bring to the roads the income, the capital and the improvements which the country requires, those who are tempted to agitate for rate reductions each on his own commodity should bear in mind that if everybody was accorded the reduction he would like, railway facilities would be inevitably diminished below the requirements of our nation's commerce. A broad policy requires the fullest support of all our citizens."

"The National Association of Manufacturers on May 18 in annual convention adopted a resolution which declared, 'It is prudent for shippers to desist from agitation for a general reduction of rates, and instead for each shipper or association of shippers who feel that they have a grievance to endeavor to compose the matter with the carrier involved, and failing that, to take the case in the orderly way to the Interstate Commerce Commission.'

"The National Industrial Traffic League on May 25, in general meeting, adopted a resolution which cites that 'there appears to be a disposition on the part of some shippers and some organizations to bring pressure to bear upon the commission, through political channels, to influence its actions with respect to certain of these adjustments'; hence the league 'respectfully submits to its membership and to the shippers of the country generally, the wisdom of proceeding in all these matters in an orderly manner, as provided in the Act to Regulate Commerce,' and reaffirms 'confidence in the Interstate Commerce Commission to act in this grave situation for the good of all interests and urges that the Interstate Commerce Commission be left free to exercise its judgment in making such readjustments of the rate structure as necessity and conditions warrant.'

"Certainty that the Interstate Commerce Commission will retain its freedom of judgment with respect to proposed rate adjustments will substantially strengthen the tendency toward business resumption. Traffic is increasing. Weekly car loadings show a steady and wholesome gain. Loadings on January 1 had fallen more than 40 per cent below

the October peak. As of the middle of June they have risen to within about 22 per cent of the high point last fall. If shippers could feel sure that the rate policy which is to prevail is the policy known to be that of the commission, such certainty would invigorate and hasten general recovery.

"Not the least item, but perhaps the greatest, is purchases by the railways themselves. July 1 will bring important new factors of encouragement. Labor cost will be reduced in several directions. Increased traffic should bring enlargement of earnings. Convincing signs that shippers and the general public are disposed to acquiesce in the rate program which the commission deems essential will put courage and vigor into railway purchasing. This will do more than any other one thing could to restore general business activity."

Railroads and Public Utilities

Urged to Buy Coal

WASHINGTON, D. C.

CHAIRMAN CLARK of the Interstate Commerce Commission has addressed letters to Thomas DeWitt Cuyler, chairman of the Association of Railway Executives; G. W. Elliott, secretary of the National Committee on Gas and Electric Service; M. H. Aylesworth, executive manager of the National Electric Light Association, and C. L. Henry, president of the American Electric Railway Association, urging the importance of having the railroads and other large users of coal acquire a reasonably liberal reserve supply of fuel now in order to prevent a possibly serious situation if all the coal consumers rush into the market at once during the latter part of the year. The letter to Mr. Cuyler, which is similar to that sent to the others, is as follows:

As you doubtless know, the production and transportation of bituminous coal has been disappointingly small this summer and is now at a disappointingly low stage. The commission requests that I write, suggesting the importance, in the interest of the conditions which may exist during the late summer and fall, of having the railroads and other large users of coal acquire now while conditions are easy a reasonably liberal reserve supply. We suggest that this matter be brought to the attention of the members of your association, together with a recommendation that in so far as is practicable they act thereon. We realize, of course, that it is not practicable to store a full winter's supply, but if a reasonable reserve is now accumulated it will help out greatly when and if a period of so-called car shortage occurs later which is in any respects comparable with that which we experienced last year. We are taking this matter up with associations of public utilities, etc., that use large quantities of coal and that need a dependable supply.

Will you kindly act on this suggestion and will you be good enough to advise us of the results?

Production of soft coal fell off sharply during the third week of June, according to the weekly bulletin of the Geological Survey. For five consecutive weeks the output had been about 8,000,000 tons. In the week ended June 18 it dropped back to 7,549,000 net tons, the lowest output reported for any full time week since the middle of May. The Geological Survey says that the cause of the decrease is not yet apparent. Shipments of lake cargo coal, on which a reduction of 28 cents a ton was made some time ago, now stand at 8,019,733 tons. This is in excess of both 1918 and 1920, but is 25,000 tons behind 1919.

TWENTY-THREE PERSONS KILLED and 42 injured, is the record of a derailment, reported on June 25, of an express train at Albert, France, on the line from Lille to Paris.

THE NEW YORK BARGE CANAL, and the problems connected with promoting navigation on the canal, were announced as the subject for discussion at an informal gathering of lake, canal and ocean transportation men, appointed to be held in Buffalo, N. Y., on June 29 and 30. The promoters aim to launch an extensive "ship-by-water" movement.

Railroad Hearings Before Senate Committee

Witnesses for Association of Security Owners Outline Economies to Be Effected by Co-operation

WASHINGTON, D. C.

VARIOUS ASPECTS of the Warfield plan for "co-ordinating" the railroads were presented before the Senate Committee on Interstate Commerce on June 23, 24, 27 and 28 by Forney Johnston, of counsel for the National Association of Owners of Railroad Securities and members of its Board of Economics and Engineering.

Forney Johnston Presents Outline of Legislation Proposed by Security Owners

Mr. Johnston gave an outline of the legislation which the association proposes to provide adequate organization among the railroads themselves for the introduction of economies in railway operation. The proposal calls for organization of the carriers by groups for intensive studies of railway economies and for a central organization, made up of members of the railway officials composing the several group organizations and an equal number of financial representatives, the purpose of the central organization being to systematize and harmonize the functions of the group organizations.

It is proposed that these organizations should have a wide measure of jurisdiction so far as investigations and recommendations are concerned, but without power of direct interference with railway management, which it was stated would not be necessary to make the economies and studies of the organization available. The chief purpose of the organization was to introduce modern methods into the study and development of transportation, regarded from its national standpoint and particularly in respect in which individual railway systems could not be expected to function as serviceably as the proposed method.

"The War College of American Transportation"

It is proposed that these organizations be authorized to act as agencies of the Interstate Commerce Commission in any matters delegated by the commission. They would constitute, in the language of Mr. Johnston, "the war college of American transportation," affording facilities for intensive laboratory methods in the production of railway economies.

The title of the bill proposed was "An Act to further economies and efficiency in railway transportation." Mr. Johnston also presented a proposed bill for the incorporation of National Railway Service Corporation to take up the work begun by the Maryland corporation bearing the same name, of supplying equipment to carriers. Mr. Johnston stated that the Maryland corporation had gone forward with the financing of railway equipment to the extent of about \$30,000,000 and desired to extend its functions; that it had been designated by the commission as an agency appropriate in the public interest to receive loans from the United States under the Transportation Act, and that its incorporation by Congress as an agency of the United States, to be operated without profit in the interest of transportation, was desirable for a number of reasons stated by Mr. Johnston. This act also proposed an extension of the power of the commission to make or refund loans to carriers out of payments on account of principal made by the carriers in settlement of their liabilities arising out of federal control or upon loans made to carriers out of the revolving fund created by the Transportation Act, as the present act limits the power of the commission to make loans to applications made before March 1, 1922. Mr. Johnston proposed that this be extended to March 1, 1930. The bill provides for the management of the cor-

poration by the present trustees, who are named in the bill, and additional trustees to be selected in accordance with its provisions.

The Financing of Equipment

The proposed bill also would authorize the recording of equipment trust agreements with the commission, thus avoiding delay and expense and the doubtful legalities arising out of the necessity for filing these instruments in all states in which the railway operates. Mr. Johnston pointed out the diversity of statutes and court opinions as to the effect of equipment trust instruments under existing laws and asserted that if the procedure to give effect to these instruments could be simplified the market for equipment obligations would be very materially extended at a time when the credit of the railroads ordinarily available to produce substantial cash payments on equipment was restricted. For the same purpose, the witness suggested that Congress should exercise its jurisdiction to require equipment obligations to be recognized by receivers in federal courts to the extent that the revenues coming into the hands of the receiver and available for such application may be available, the witness stating that provisions of this character would make it possible for the railroads to market their equipment obligations on terms which would encourage the acquisition of equipment and said that some stimulation of this character was indispensable to invite the purchase of equipment by the carriers sufficient to handle commerce satisfactorily in the event of appreciable increase in the tonnage offered.

Senators Kellogg and Pomerene asked questions indicating that they did not think much of the idea of multiplying existing agencies for dealing with transportation matters.

What the Proposed Bill Provides

The proposed bill provides that the National Railway Service Corporation shall be an agency of the United States, to be operated in the interest of the commerce of the people of the United States. The objects and purposes for which it would be created and the general powers and functions which it may exercise and discharge are stated as follows:

To aid, assist, further and supplement the service of transportation by carriers by railroad subject to the Interstate Commerce Act.

To assist such carriers in their financial and refunding operations and in the acquisition or use of terminals and other facilities.

To carry on the enterprise and business of constructing, acquiring by purchase or lease or otherwise, selling, leasing, and otherwise contracting with reference to, maintaining, managing, repairing, disposing of and dealing in locomotives, cars, rolling stock, equipment, appliances, materials and supplies required by carriers by railroad.

To acquire, own, and operate terminals and facilities of all kinds useful in or in connection with interstate transportation whenever and on such conditions, if any, as the commission may authorize or prescribe.

To receive, administer, invest, lend or otherwise employ or deal with any fund or other assets which may be loaned or made available to the Corporation by the Interstate Commerce Commission pursuant to the provisions of the Transportation Act, 1920, as now or hereafter amended or any other act, or by the United States or by any other party or from any source.

To act as an agency of the Interstate Commerce Commission in the matter of loans for the purchase of equipment and to act as an agent or agency of, assist or serve the commission in all such matters, to such extent and in such respects as the commission may by general or specific order provide.

To advise and to co-operate with the commission in the

matter of, and to supplement in whole or in part, refunding or new loans to or for the benefit of carriers from the proceeds of principal paid or repaid from time to time upon indebtedness of carriers to the United States arising out of Federal Control or upon loans made in pursuance of Section 210, Transportation Act, 1920, as amended, which are hereby authorized and directed to be made by the Secretary of the Treasury to such carriers and to the corporation on certificate of the commission on the terms and conditions provided by said Section 210, from time to time as the commission may find desirable in the interest of railway transportation, until March 1, 1930.

To borrow and lend money and to mortgage, pledge or hypothecate any property or interest the corporation may own.

To issue, buy, sell, mortgage, pledge, exchange and deal in the bonds, stock, debentures, certificates, evidence of obligation or indebtedness or representing an interest in or secured by property used or useful in interstate commerce or commonly associated or dealt with in connection therewith; and securities of carriers engaged in interstate commerce or to act as general or special, fiscal or financial agent, trustee, receiver, syndicate manager, underwriter, of or for any carrier or property used in interstate commerce or owned and held as incidental or accessory thereto, such as the properties commonly owned by interstate carriers or described in mortgages of interstate railroads; and to undertake and discharge the functions aforesaid as transactions in interstate commerce or accessory thereto without being required to qualify under the laws of any state for the transaction of local business in respect thereof.

It is made the duty of the corporation to the extent that it may find the same useful and appropriate "to invite and encourage the use of the corporation by all carriers as their common or general agency in all matters of general interest, such as the clearing and interchange of cars, reciprocal service, the clearing of accounts, the settlement and allocation of loss and damage claims, the arbitration of differences, and in all matters in which a common agency would be desirable; to act as a bureau of complaints to which the public may apply for prompt assistance in securing attention to just grievances; to keep constantly informed as to the traffic and operating conditions of the railroads, and to anticipate and make provision for car supply and distribution; to investigate and report to the commission and to the carriers interested plans or suggestions for advancement of the commerce of the United States, for unification of service where beneficial, for joint use of terminals or facilities, for the construction of additional facilities, and in respect to all matters as to which the commission has authority to act; and to provide at all times an efficient organization available for any national or regional emergency affecting interstate commerce."

It would have the right and authority to acquire, condemn, or subordinate private property, easements, or franchises to the public use in such cases and to the extent of such easement and so conditioned and qualified as may have been authorized by the commission as compatible with the interest of the public and the commerce of the nation and consistent with the purposes of the corporation; and "may proceed for the enforcement of such right in any state court having jurisdiction of the property or defendants and jurisdiction of such matters or in any federal district court having jurisdiction of the property or of the adverse interests or any one of them, under direct authority of this act."

Co-ordinating the Purchase of Coal

Statement by Edwin Ludlow

Edwin Ludlow, president of the American Institute of Mining and Metallurgical Engineers, outlined the advantages of co-ordinating the purchasing of fuel supplies for the railroads by groups as follows:

The allocation to each railroad of a uniform grade of coal.

The avoidance of cross hauls, supplying each road from the most available supply with a minimum of mileage.

Placing of the fuel supply on a scientific basis, with the employment of inspectors to maintain the quality of coal shipped and the checking up of the results from the performances obtained.

The close co-operation that such a committee could have

with the coal operators, obtaining in that way co-operative results of economy and efficiency that cannot be obtained under the individual basis of buying as at present.

Stabilization of the bituminous industry through purchasing greater amounts of coal during the summer months and storing it for use, with diminished shipments in the winter months. The advantages of this may be summarized as follows:

The direct saving to the railroads in the lower cost of their fuel supply, taking into consideration the cost of storing and rehandling.

The direct saving to the operators in the cost of producing the coal, due to steadier work, enabling them to make lower prices for the railroad supply.

The general advantage that will accrue to the whole bituminous industry from the stabilization of production, reducing the amount of idle times at the mines and enabling the mine laborer to have full time employment throughout the year.

The advantage to the railroads in the utilization of the empty cars during the summer and reducing the movement of their own fuel coal during the winter months when the cost of operation is highest and the demand is greatest for coal cars for domestic supply.

By making long-term contracts with producing mines they will be able not only to equip their mines better for the extraction of coal, but also for the housing and welfare of their employees, being sure of a defined all-the-year-round tonnage that will warrant their making the necessary capital expenditures.

Advantages to the Public

The public will be greatly benefited through an arrangement of this kind, releasing the mines under contract to the railroads from a proportion of their tonnage in the winter months when the coal is needed for domestic purposes. The stabilization of the industry in this way will avoid the serious fluctuations which have occurred in the coal business during the past few years.

Some railroads have fuel agents that are carefully studying the subject, but in the majority of cases the fuel purchases are handled through the purchasing agent, who buys the coal as he buys other supplies—either taking what appears to him to be the cheapest, or else buying some special quality of coal that his operating men consider essential for use on their divisions.

Locomotives Require Coal of Uniform Grade

In many cases this means that various coaling stations on the same lines of road often receive different qualities of coal, some of it of high volatile and some of it of low, making it impossible for the same locomotive to obtain efficient results, as each type of coal requires special drafting arrangements in order to obtain the most economical consumption. There is also a very large amount of unnecessary mileage used by the various railroads in the purchase of their coal. Some roads in the West, for example, are satisfied that they are obtaining the best results from Illinois coal; other roads in the West consider that Illinois coal is of too poor a quality and that they must purchase their coal in West Virginia or Pennsylvania, necessitating the long haul through states that are producing coal that could be used.

Advantages of Buying by Groups

If the railroads of the country could be divided into four or more groups in the same manner that they are arranged for tariff purposes and a competent fuel engineer selected in each group to supervise the purchases very large economies could be obtained—

He could, with a competent staff of inspectors under him, give an intensive study of the requirements of the group of which he was in charge and also the sources of supply both as to quantity and quality. The work that has already been done in the way of forming what is known as pools of similar qualities of coals to enable vessels to buy a uniform cargo while receiving coal from many mines will be the greatest assistance in purchasing uniform grades for use on the divisions avoiding the economic loss that occurs when an engine receives a grade of coal different to the kind for which it has been drafted.

The fuel directors in each group will be able to co-operate with each other and the fuel resources can be mapped out and the distribution made from a scientific basis, avoiding unnecessary hauls.

The value of coal will be based on the number of B. T. U.'s that can be purchased for a dollar at the point of delivery considering not only the cost at the mine but the freight haul.

Storage

The purchasing also is done on a consumption basis and the railroads buy 1,500,000 tons more per month in winter than they do in summer and no attempt is made to store coal except

in a few cases of railroads who have no mines on their own lines and have felt the difficulty and expense of trying to obtain coal during the winter months when the traffic of the railroads is congested and the mines are only working half time for want of cars. The position of the coal operator is that, during the spring and early summer, his mines are running on about half time for want of orders, that he gets his high peak of output about October, and that during the winter months, when the demand for domestic fuel is the greatest, his operating time is cut down for want of empty cars, due to congested transportation, so that his output is again reduced to about 50 per cent of his capacity.

It will be claimed by many roads that they have attempted to put in storage and found it a failure. This matter was also examined into by Eugene McAuliffe when acting for the Fuel Administration, who found that, in spite of the careful instructions that had been sent out as to how this storage was to be accomplished, in 90 per cent of the cases no attention had been paid to the instructions. The coal had simply been thrown out of the cars by section men, without any preparation of the ground, and the result was that in picking up this coal the locomotive crane usually gathered enough of the soft surface on which it was thrown to show a recovery greater than the amount of coal put down.

Advantages of Long-Term Contracts

If the railroad companies would enter into long-term contracts with mines and would arrange such contracts on a basis of permitting excess shipments during the four dull months of April, May, June, July, and a reduction in shipments during the congested months of November, December, January and February, such companies would be willing to make a very much lower price that would materially decrease the railroad's fuel cost, and if these contracts went over a period of years, with a sliding scale arranged on the basis of the cost of labor, they would have the incentive to equip their mines thoroughly, not only for the most efficient mining of coal, but also for the proper housing of their employees, and with the steadier period of operation throughout the year that such shipments would permit, the working time of the miners and their annual earnings would materially increase, eliminating a great deal of the discontent which now comes where mines are operated for less than 200 days in a year. Such action by the railroads would go a long way to stabilizing the coal industry, as it would not only keep the mines in more continuous operation, but, at the same time, would permit these mines to supply the domestic demand that the country requires during the winter months.

Increased Freight Earnings

Another advantage to the railroads would be a more uniform freight traffic, and the records show that the earnings of the railroads follow closely as a whole the movement of bituminous coal. They would have during the congested winter months the cars needed for the domestic demand and would, at the same time, have a storage of their own, relieving them from the necessity of confiscation, which is now one of the most demoralizing elements in the coal business and further avoiding the necessity of assigning cars to keep up their fuel supply in winter.

Conclusion

The whole situation of the purchase of coal should be one of co-operation with the mines and, by helping the mines during the dull summer months to carry their overhead expenses, the railroads would receive their coal at a much lower price not only sufficiently lower to pay for the expenses of storing and picking up, but also at a considerable saving on the total fuel cost, and the whole country would be relieved of the congestion and uncertainty in the coal business, which has happened so frequently in late years, and of which 1920 was our worst example. The stabilizing of the coal industry is recognized as one of the necessities for the real prosperity of this country, and the railroads, using 33 per cent of the entire output of our bituminous mines, are the ones who can do the most towards stabilizing, if they will work in co-operation with the coal miners to that end.

Joint Terminals and Facilities

Statement by John F. Wallace

John F. Wallace, of Chicago, told the committee that the application of the competitive principle to the development of railway terminal facilities at large commercial and industrial centers has resulted in the duplication of terminal facilities and railroad service, and as a consequence of this, these competitive developments have resulted in the burdening of

the railroads with unnecessary capital expenditures and greatly increased operating expenses. He said in part:

The complete application of the competitive system to railway freight terminals falls of its own weight. Each road cannot secure and maintain terminal facilities covering the entire terminal area. It cannot secure, maintain and operate adequate terminal facilities in each and every section or district within the metropolitan terminal areas where important freight traffic originates. Nevertheless, the attempt is made under existing methods to cover as much as possible of the entire field by separate and competitive terminals, with the resultant complication of facilities and a duplication of financial investment.

In the terminal district of Chicago as a whole—and the same thing applies to other cities—the unnecessary complication and duplications of terminal facilities is so extensive that it is a burden upon the railroads, the shippers and the public.

The investment by railroads in unused or little used property to protect real or fancied present or future competitive conditions is also a source of great expense to the railroads and ultimately to the public—although not often fully realized as such. The interest on these investments is absorbed in the general interest charges on the entire property and is lost sight of as being an expense due to unproductive investments.

Should Be Treated Co-operatively

If the terminal situation were treated co-operatively instead of competitively there could be a simplification of the tangled network of tracks that now exists, the release to general commercial purposes of large and valuable property now held by railroads for competitive purposes or prospective competitive needs, the reduction of operating costs in the terminal handling of freight, and an increase of efficiency.

To the public this would mean not only the improvement of service to the shippers, but the reduction of street congestion and the removal of existing obstacles to the growth and development of the city.

An outstanding example of the disastrous effect of the application of the competitive principle to railway terminal operations is found at Chicago. This is true, first, because of the size of the Chicago terminal district in point of area covered, number of railroads entering, and volume of traffic; second, because of topographic and geographic conditions.

Chicago is served by 26 trunk line railroads and five major belt lines, besides several small roads performing terminal functions. Railroad developments occurred in all sections of the city and there was nothing in a physical way to prevent a railroad entering the city at one point from attempting to reach and duplicate the facilities of a railroad entering from the opposite side. It is because of this situation at Chicago that more attention has been directed to the terminal problem there, but the same problems exist in a lesser extent at all of the great railroad centers of the country, and the principle which would apply to the proper solution of this terminal problem at Chicago would be equally applicable to the terminal problems at all other large centers. There is practically a unanimous opinion among railroad executives that the unified or co-operative operation of railway terminals is not only desirable, but will eventually be necessary. It is doubtful, however, if the railroads left to their own resources will be able to evolve through independent effort a satisfactory co-operative railway terminal operating plant.

The Situation at Chicago

During the period of government control, primarily at the suggestion of the Chicago Railway Terminal Commission, the operation of the terminals at Chicago and other large centers was placed in the hands of terminal managers for the purpose of operating these terminals as units and in order to secure the greatest possible efficiency. Economies were secured through the unified operation put into effect by the terminal managers, but the results obtained were not at all indicative of what could be secured through the complete unified operation of the terminals in normal times.

Nevertheless, even under the conditions outlined above, substantial economies were effected and the movement of freight was expedited, and the experience fully justified the argument in favor of unified terminal operation.

The statements herein made are simply my individual conception of the terminal problem and ideas suggested to the Board of Economics and Engineering for investigation. It is the formulated policy of the Board of Economics and Engineering that the individual members thereof shall submit their personal investigations and opinions to the board for its final analysis before any reports are made that will require the sanction of the board as a whole. In other words, it is the plan and policy of the board to act as a unit, and the presentation which I am making

of this subject is merely intended to give your committee a general idea of the scope and purpose of our future investigation, with a few illustrations necessary to clarify the situation.

Mr. Wallace said it was not proposed that the Board of Economics and Engineering should be a disturbing element in the situation in any way. It proposed to analyze the various problems and to try to be helpful by making suggestions. He said there is not a railroad executive in the United States that is not loaded down with routine daily duties which give him little time for the consideration of larger problems. Their staffs are also overloaded, he said, and if Mr. Willard or Mr. Rea or Mr. Smith could "sit down and put their feet on the table and smoke a cigar for two or three hours a day they would be better executives." He thought the board might be able to make some suggestions that the executives would recognize as helpful, but it has no idea of trying to inject another complicating element into the railroad situation.

The Interest of the Savings Banks

George E. Brock, president of the Home Savings Bank of Boston, and president of the National Association of Mutual Savings Banks, said that these banks own approximately \$900,000,000 of railroad bonds and have been greatly concerned over their investments while scarcely any railroad bonds are being purchased by savings banks now. They are willing to own more railroad bonds if proper safeguards can be placed around railroad investments and for this reason they have supported the work of the National Association of Owners of Railroad Securities which they thought had been very helpful. He expressed the hope that the committee would give careful consideration to the plan suggested by Mr. Warfield, although in reply to a question by Senator Cummins he said he did not consider himself a competent judge of the details of the plan. Mr. Brock said that mutual savings banks and life insurance companies are the two most prominent sources from which future capital for the railroads can come and that under proper circumstances the mutual savings banks might furnish \$100,000,000 a year of new capital. He thought Mr. Warfield's plan applies to the railroad system a plan similar to the Federal Reserve System applied to the banking system, which has worked out well.

Equipment Standardization

Statement by L. B. Stillwell

L. B. Stillwell, consulting electrical engineer, said that the board has been instructed to report on railroad rolling stock with a view to standardization and improvements in construction and maintenance. He believed that many improvements can be effected, which he outlined, although he said the board had merely begun its study of the subject. He said the American Railway Association, Mechanical Division, has recommended standards which have been adopted to a considerable extent, but the American Railway Association cannot enforce its recommendations and the standardization that has been adopted mainly applied to the parts of cars. He thought that through the medium of the service corporation to acquire new equipment it would be possible to attain results which the railroads have not been able to attain. The board is studying the further standardization of freight and passenger cars, the establishment of a system of periodic repairs, the strengthening of weak cars or their restriction to local lines, and other similar subjects. He said that a limited number of standard types and sizes of cars should be adopted, although he thought the Railroad Administration went too far in the direction of standardization. Very little has been done, he said, in the direction of standardization for the purpose of economy either in construction or maintenance and the present large number of varieties of cars required the keeping of many kinds of repair parts or a delay

until the part needed can be obtained. He referred to the present system of car repairing as "theoretically almost impossible" and said that the fact that cars spend so much of their time on foreign lines where they are inadequately repaired makes them wear out quickly. He said standardization should be accomplished by selecting a few of the best types now in use, possibly with some improvements, such as a design that would give a car of less weight in proportion to the carrying capacity.

Mr. Stillwell's statement follows in part:

From the experience gained in operating these cars, a limited number of standard types and sizes should be selected or developed for interchange service and thereafter adhered to, except in special cases where the reasons for deviation may unquestionably be controlling.

Standardization should not preclude development and improvement in design and material, but should secure interchangeability as regards component parts, and it should define minimum limits of strength of essential parts. This can be done without sacrificing the advantages of competition between manufacturers in the development and sale of their specialties, as the establishment of minimum limits in no way precludes progress by improvement of material or design within the dimension limits fixed by the interchangeability rule.

Standardization will enable the manufacturer to reduce his costs by reducing the number of rolled forms, sizes of plates, special pressed members and also dies and templates which he must provide. It will also reduce his costs by saving time and consequently overhead expense. What is perhaps still more important, it will effect a great saving of time and overhead expense when the cars are repaired.

In selecting or developing standard cars, life and weight are of the greatest economic importance. For illustration, if the country has 2,500,000 freight cars and the average life is 20 years, 125,000 cars per annum must be purchased for replacement. If the average life could be increased to 30 years, by improved design and systematic maintenance, the same result would be accomplished by purchasing 83,000 cars per annum. The difference, namely, 42,000 cars, at present prices would cost about \$100,000,000.

As cars now in use become worn out to a point where it will no longer pay to repair them, they will be replaced in general by cars of larger capacity and less aggregate weight as compared to the load carried.

As regards weight of freight cars, its relation to the cost of operating railroads and the wide divergence of opinion as to what weights are necessary are illustrated by the fact that the standard box car designed by the United States Railroad Administration was criticised in a statement issued by the executive committee of one of our most important railroad companies.

According to the Interstate Commerce Commission Report for 1918, there were at that time on Class 1 roads, 1,038,751 box cars. Within the next 20 or 25 years practically all of these cars will be replaced by new equipment and obviously it is of very great importance that the weight of new cars should receive most careful consideration.

Broadly speaking, durability (life) points toward an increase of weight in design, but weight does not necessarily mean strength, and it is obvious that the interests of the railroads call for a complete study and action which will secure durability without excessive weight.

Much good work has been accomplished by the mechanical departments of the railroads, but it is inevitable that where each railroad practically determines its own standards of design, a considerable variety in the degree of excellency attained must result.

The time certainly has arrived when the state of the art in car design and construction should make it possible to select or design a limited number of the best types and sizes and avoid the losses which must result from further construction of cars of inferior design. Moreover, aside from difference in mechanical excellence, or deficiency, it is obvious that the mere reduction in the number of designs of cars of a given type will tend to secure a reduction in first cost and in cost of maintenance.

Under present conditions, each railroad specifies its own design, which may be good or otherwise, and normally less than one-half of these cars will be found in operation on the lines of the railroad company which owns them, the rest being scattered over the country in interchange service. When traffic is heavy the percentage of cars on lines of the company owning them drops in some cases, as low as 25

per cent. Under these conditions a majority of the repairs must be made by foreign lines and the cost of such repairs in time and money is greatly increased by the variety of designs and of specialties used.

If standardization from the standpoint of the railroads as a whole can be established and sound maintenance and retirement policies fixed, savings very large in the aggregate will undoubtedly be secured. In this connection the mere cost of unloading and re-loading cars which require repairs is a heavy item of expense charged against traffic and frequently involving delay and indirect expense serious to the shipper.

In 1920 the cost of maintaining freight cars owned by Class 1 railroads was over \$600,000,000. Looking to the future, there is every reason to expect that if a policy of standardization can be adopted by the railroads as a whole, a very large saving in cost of maintenance will gradually become effective as present rolling stock is replaced.

Obviously standardization which will secure interchangeability of parts and also establish adequate standards of strength of material and methods of construction will effect important economy in the cost of maintenance. Standardization will also be of great value in reducing the number of cars temporarily out of service for repairs, much time being lost under present conditions by the frequent necessity of awaiting arrival of spare parts at interchange points where repairs are made.

STABILIZING ORDERS FOR CARS

A great reduction in builders' costs and in prices to the railroads would result if it were possible to stabilize the placing of orders for both new cars and for replacement parts. Under present practice when railroad earnings fall off, orders for equipment are curtailed, and when earnings increase, orders in large quantity are placed. The very wide fluctuation in output of the manufacturers of equipment which results, operates to increase greatly the average cost.

STABILIZING MAINTENANCE

A condition which results in a very great increase in cost of railroad operation exists in present repair practice, each road being supposed to repair all cars which develop the need of repairs while on its lines.

For best results, maintenance should be pushed especially during periods of light traffic. Present methods tend to make repairs keep step with the monthly earnings of the railroads.

If it were possible to carry on repairs systematically at all seasons regardless of the earnings or losses of individual roads, a great saving could be effected. This would not only mean a reduction in the cost of maintenance, but would secure greater reliability of service and freedom from breakdown and would stabilize labor conditions in the shops. On May 15, 1921, the Car Service Division of the American Railway Association reported 324,969 freight cars in bad order. This is approximately 13 per cent of the total number of freight cars in this country. This percentage is abnormally great, but there is little relief in sight.

Obviously the best interests of the railway industry as a whole require that in slack periods when cars are plenty such cars should be put into good condition in order that they may be available when heavy traffic returns. Under present conditions, repairs are often postponed because of lack of available funds.

It has been estimated that 15 per cent of the cars in railroad ownership are structurally too weak for modern service conditions in interchange service. Such cars should either be adequately reinforced or withdrawn from such service, as their maintenance is now abnormally expensive and they are responsible for a large proportion of loss and damage claims.

PASSENGER CARS

As regards passenger cars the economies which can be effected by further standardization of design, material and methods of construction are less than in the case of freight cars for the reason that the former are comparatively few in number. Nevertheless, important savings are possible in this department. The wide variation in practice under the present system which permits each railroad to evolve or select that particular steel passenger coach which it may prefer may be illustrated by an example.

Three Class A railroads are today operating between two important points in this country, 70 foot passenger coaches, identical or practically identical in dimensions, having respectively the following weights:

Railroad "A"	142,000 lb.
Railroad "B"	124,000 lb.
Railroad "C"	119,000 lb.

In this instance, the railroad which uses the heaviest car is operating under conditions which in general are less difficult

as regards grades and curves than those of the railroads which operate lighter equipment. The difference between the heaviest car and the lightest is 23,000 pounds, and the cost of hauling this difference of weight on the basis of over 40,000 car miles per annum at high speed becomes a considerable item of expense. The difference in the cost of coal required for the operation of 50,000 cars like those operated by Railroad "C" on the one hand and those operated by Railroad "A" on the other would be approximately \$24,000,000. Without expressing here an opinion as to whether the heavier car is or is not justified, it is obvious that both cannot be right.

As regards the advantages of stabilizing orders for passenger cars and of standardizing and so reducing the number of rolled forms, sizes of plates, pressed members, dies and templates which the manufacturer must provide, the advantages which would result are like in kind with those which apply to freight cars, although less in amount.

LOCOMOTIVES

The Board of Economics and Engineering is not prepared at this time to suggest any program relative to locomotive improvements. Its present view is that great caution must be exercised in any attempt to standardize design at this time when under the stimulus of high fuel cost both the manufacturers and some of the railroads are making substantial progress in developing more efficient locomotives. Moreover, the fact that locomotives, except in rare instances, are operated exclusively upon the lines of the company owning them and are repaired in the shops of the company under contract by locomotive builders, avoids in great part the expense and delay which result in the case of freight cars from the fact that more than half of all repairs are made in shops of foreign lines.

PROPOSED METHOD OF SECURING THE ECONOMIES

The Board of Economics and Engineering understands that the National Railway Service Corporation, in financing further purchases of equipment, proposes to—

(a) Insist upon the adoption of standards of design approved by it.

(b) Provide systematic and competent inspection during construction of the equipment so financed to ensure the best practicable material and workmanship.

(c) Establish and maintain systematic and competent inspection of repairs to its cars at interchange points, in order that the interests of the equipment note holders may be protected against the losses and delays incident to the methods of maintaining car equipment which now prevail.

It is the opinion of the board that the establishment of such a policy by the Service Corporation will assist materially in financing equipment and can be made effective in securing far-reaching economies.

The board also believes it is reasonable to expect that the establishment of such policies and methods would receive the approval of the Interstate Commerce Commission, and if this is given there can be no question of their general adoption by the railroads.

ELECTRIFICATION

The board is not prepared at this time to state any conclusions in regard to electrification of railroads. It recognizes the fact that the economic possibilities of electrification as applied to local conditions of heavy grade and dense traffic and to terminal operation are such as will justify very careful examination, but feels that its attention should be concentrated at present upon other features of the railroad problem which appear to present opportunities for greater saving of operating costs as compared to new capital required. Mr. Stillwell said that to electrify the railroads of the country would cost seven to eight billion dollars and he did not expect to see the whole job undertaken.

Director Colston Testifies

At the request of the security owners' association, W. A. Colston, director of the Bureau of Finance of the Interstate Commerce Commission, testified before the committee on June 29 to explain that in his opinion the National Railway Service Corporation had been very helpful in financing purchases of equipment for certain roads with the help of funds provided from the revolving fund. He said that it had enabled some carriers to get loans which otherwise could not have raised the part of the money which it was necessary to

finance outside at a rate of interest which would have been approved by the commission. When a road said it expected to pay more than 7 per cent for outside money, Mr. Colston said, it had been told that Mr. Warfield's corporation would furnish it at 7 per cent, 40 per cent of the cost being provided from the loan fund. Mr. Colston thought that the extension of the powers and scope of the service corporation as proposed by Mr. Warfield would enable it to perform an important service in financing railroad equipment and other improvements and that it could save a large part of the expenses of financing. If this corporation, he said, working in the public interest and under the direction of the Interstate Commerce Commission, could be allowed to administer the \$300,000,000 revolving fund and the various railroad assets now held "frozen" in the United States Treasury or by the Railroad Administration or the War Finance Corporation it could accomplish much more than it had and if to this amount should be added the \$750,000,000 which the carriers now propose that the government fund it would have a capital of about \$1,500,000,000 and on this basis it could probably raise \$3,000,000,000 additional, or a total of \$4,500,000,000, which would be enough to finance all the railroads in the United States at 6 per cent or less. He referred to the large amount of railroad financing carried on during the early part of 1920 at a cost of about 7½ per cent or more and he referred to the recent refunding of the Great Northern-Northern Pacific joint bonds. Two hundred and thirty million dollars of new 6½ per cent bonds, he said, were sold at 91½ to provide the money to pay off \$215,000,000 of the old 4 per cent bonds and nothing was added to the railroad facilities of the country. Whereas the issue of 4 per cent bonds had originally cost \$3,000,000, the cost of the refunding had been \$21,000,000, of which \$11,500,000 went to the syndicate. J. P. Morgan & Co. received 1½ per cent as syndicate manager and the syndicate received a gross profit of 3½ per cent. If the National Railway Service Corporation had been able to handle this transaction, he said, many of the old bonds could have been exchanged for the new without any cost and a great deal of money could have been saved.

Work of the Bureau of Finance

Mr. Colston, in explaining the work of the Bureau of Finance of the Interstate Commerce Commission since its organization about a year ago, said that it has received 102 applications for certificates authorizing the construction of a new line or the abandonment of an old line, involving 3,318 miles, and it has acted on 56 applications involving 2,310 miles. It has received 9 applications involving 1,056 miles for authority to assume control of roads or to consolidate them, and it has acted on two, involving 503 miles. It has received 308 applications for authority to issue securities, of which 11 have been withdrawn, 245 disposed of and 52 are still pending. The total securities authorized in this way have amounted to \$561,000,000, which, however, include some duplications in the case of bonds to be pledged as security for other bonds. The total includes \$91,000,000 of equipment obligations, \$5,000,000 of debentures, \$2,392,000 of receivers' certificates, \$51,000,000 of notes and \$411,878,000 of bonds. Mr. Colston said that the state of Michigan and several middle western states have protested against the commission's jurisdiction to authorize security issues. He also said that except in matters plainly involving the public interest, the commission had not attempted to substitute its judgment for that of the companies. The commission has issued certificates for approximately \$431,000,000 on account of the six months' guaranty and the administration of the guaranty provisions of the law represent the principal work of the bureau now that most of the loan fund has been exhausted. The \$300,000,000 loan fund, he said, has been increased to \$304,652,000 by interest pay-

ments, etc. Forty million dollars of the amount is reserved for judgments against the Railroad Administration and the commission has certified loans to the amount of \$228,000,000, approved additional loans to the amount of \$10,000,000 not yet certified, and is tentatively committed to \$25,000,000 more, leaving a balance of \$935,000 of the fund now available.

Shippers Aid in Claim Prevention

THE FREIGHT CLAIM DIVISION of the American Railway Association, which launched a campaign to cut loss and damage claims in half at its 1921 annual session in Chicago, will not work unaided if a recent circular issued by the Illinois Manufacturers' Association is any indication. The substance of the circular, which is entitled "Plugging Up the Loss and Damage Leaks," follows:

"Freight claims against the railroads are a source of endless annoyance to all shippers. Even if shippers ultimately get all the money that is due them, the delay and bother are irritating. Furthermore, it costs the railroads more money than they can afford to pay in these days of high labor costs and diminishing returns. In 1919 the carriers paid out \$107,000,000 in freight claims.

It is in the interest of shippers to avoid damage claims. Here are some of the ways by which injury to shipments can be avoided:

1. Test containers to be sure that they are sufficiently strong to stand ordinary abuses in transit.
2. See that commodities are securely packed in containers.
3. Do not use a crate, where a box should be used; it is more expensive in the long run.
4. Make sure that marking is legible and that it includes all information necessary. It also should include shipment date.
5. See that shipments are securely stowed in your cars when you load them. If necessary, brace with substantial material. This will prevent shifting of the load. A piece of electrical machinery that cost nearly \$200,000 that was shipped to a Chicago firm was practically ruined, because a six-inch space was left in the shaft blocking which caused the load to shift in transit. In this instance the shipper was held responsible for careless blocking.
6. If identification marks will be inclosed inside the package, consisting of the date of shipment, name and address of consignee and the name and address of the shipper, difficulty in tracing shipments will be obviated to a large extent.
7. It is a good idea to put two tags instead of one on bundles, bars, baskets and other shipments which require the marks to be shown on tags. A reinforced tag should be used. Include packing list with shipment where possible.
8. It is suggested that on small packages, freight, express and parcel post shipments the labels be typewritten and made in triplicate, placing the original on the outside of the package, the second copy inside the package, retaining the third copy for future reference. This helps to substantiate claims on shipments. Where there are cities and towns of the same name in more than one state, it frequently happens that the carrier forwards the shipments to the wrong state and then contends that the package was erroneously marked."

THE ILLINOIS CENTRAL transported a record movement of strawberries from the Louisiana district this year, 1,389 cars being moved in 1921, as compared with 967 last year.

THE FIRST MEETING of the New York University Transportation Club was held at the Wall street division of the University, 90 Trinity place, New York, on June 2. The meeting was addressed by the following speakers on the subjects indicated: J. H. Butler, manager loss and damage department, American Railway Express, on the "Right Way" Movement and some of the results it has accomplished; A. J. DeHaas, of the faculty of New York University, on the Relation of Foreign Trade to American Transportation; H. T. Young, general agent, freight department of the Erie, on the Development of Package Car Service. The Transportation Club has been organized for the purpose of enabling those who are or have been connected with New York University to keep closely in touch with all phases of foreign and domestic transportation. The club is under the direction of Asa Colton, lecturer on trade and transportation in the University.

New Traffic Locking on C. & O. Relieves Congestion

New Signal Facilities Obviated the Necessity of Constructing an Expensive Second Track

By H. E. Johnson

Signal Inspector, Chesapeake & Ohio, Richmond, Va.

TRAFFIC HAS BEEN greatly facilitated on congested stretches of track on the Chesapeake & Ohio by the recent installation of a new system of traffic locking. On account of tunnels and narrow gorges the expense of the construction of a second track at certain points was prohibitive. The new system has proved so reliable and free

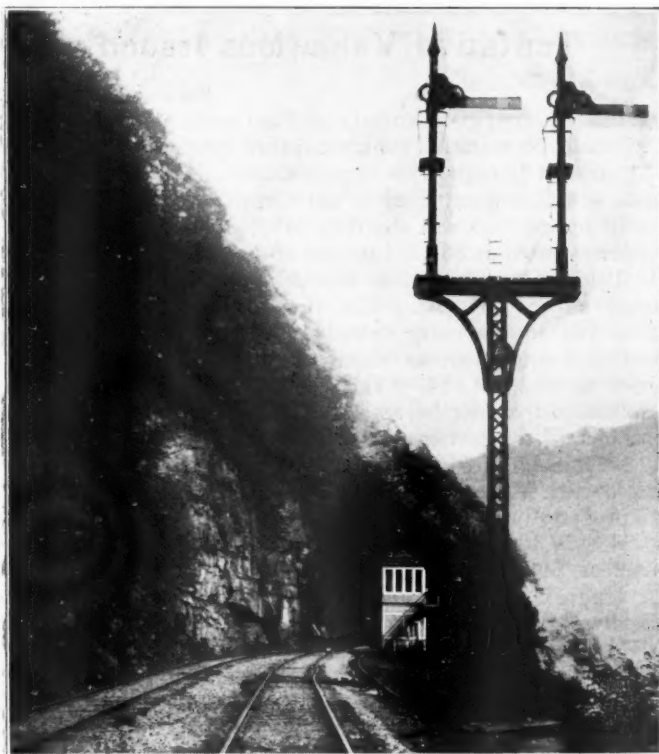
frequency, the apparatus being immune from the effects of direct current and inoperative on alternating currents having commercial frequencies of 80 cycles or less. It is believed that, as installed, the scheme guarantees absolute integrity of operation and is as nearly foolproof as it can be designed. The apparatus consists primarily of a generator, hand driven where power is not obtainable, a selective switch, a selective frequency lock, a push button and an a.c. buzzer. This apparatus, except the generator and the selective switch, is duplicated for each traffic lever.

The arrangement of the locking segment or slot is such that the indication latch can be raised only when the traffic lever is at the indication position, and that when the lever is returned to the normal position the indication latch is mechanically forced to the de-energized position.

Cotton Hill to Gauley Installation

Traffic locking of this type was first installed on a four-mile stretch of single track on the Hinton division between Cotton Hill, W. Va., and Gauley, in conjunction with A. P. B. signaling. This single track, which runs through a narrow gorge or canyon, connects the ends of double track at Cotton Hill and at Gauley. The river, which is on one side of the track, is very close throughout the entire length, while on the other side are high cliffs of solid rock. The course of the river, is irregular, making necessary many sharp curves in the track and permitting but few tangents, the longest of which is about 1,000 ft. It was necessary to construct three tunnels on the course of this difficult length of single track.

All main line eastward and westward traffic must pass over this single track, which presented a serious operating problem worthy of careful consideration. It had been proposed at various times to build a second track in order that the "neck of the bottle" might be eliminated, but the cost of the proposed second track was considered prohibitive. Traffic was formerly controlled by means of an absolute train staff system with mechanical interlocking at Cotton Hill and at Gauley, there being no automatic signals on the single track, but with the present installation of A. P. B. signals and traffic locking, operating officers claim that the



Approaching Cotton Hill Interlocking From the East

from chances of false indications that all classes of traffic are now diverted on double track and controlled in both directions on single track by signal indications exclusively, written train orders being eliminated.

The consensus of opinion of those interested was that none of the existing schemes could guarantee safety because of their inherent faults, the first of which is the possibility of receiving energy from some foreign source. This contention is substantiated by the fact that on several occasions on various lines using some form of locking between towers, or traffic locking, false indications have been obtained, which have resulted in the loss of life and property in some cases.

After much study the scheme finally decided upon was one involving the use of alternating current of 125 cycles



Track and Signal Plan, Cotton Hill to Gauley

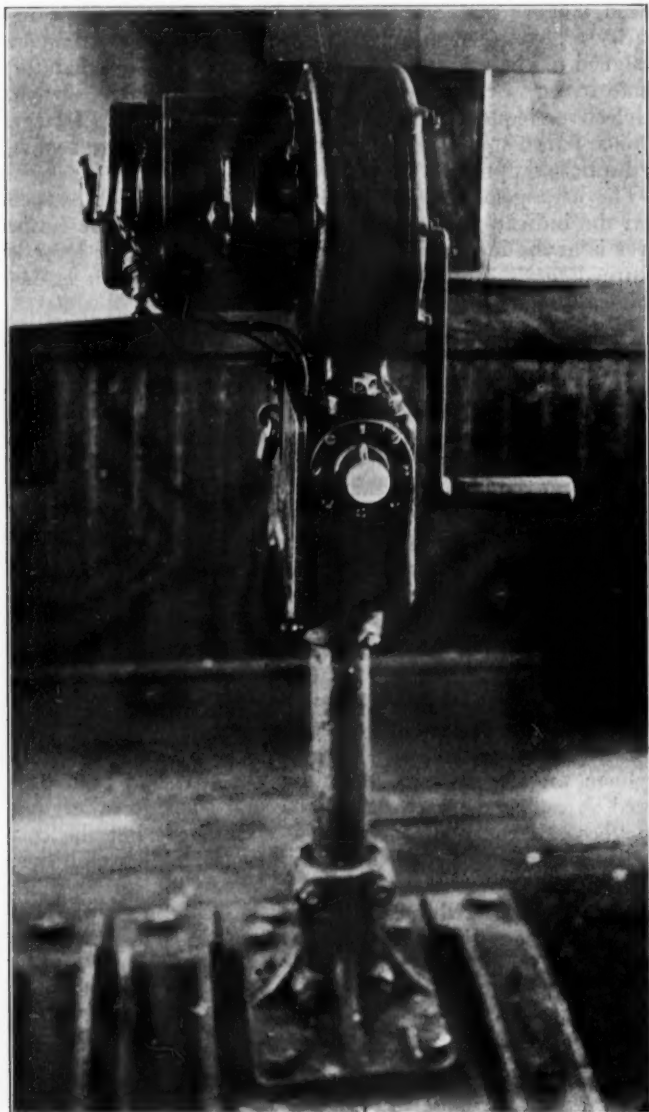
traffic conditions have been improved over 200 per cent.

The track layout of this installation is shown in the diagram. The entrance or starting signals to the A. P. B. territory are interlocking home signals, L 2 at Gauley and R 5 at Cotton Hill, and these lock traffic levers 5 and 7 reverse, respectively. The home control of automatic signal 4132 is carried over the normal contact of traffic lever 7 at Cotton Hill and the home control of automatic signal 4131 is carried over the normal contact of traffic lever 5 at Gauley.

This checks the absolute feature of the A. P. B. circuits. The permissive feature is obtained by the use of a relay of the selector type.

The Track Plan and Circuit Diagram

One of the novel features of the scheme is that communication and unlocking is accomplished over the same wire. It was also found that, due to the change in tone of the buzzer at the generating end of the circuit when the lever was being unlocked, it was unnecessary for the operator to push the button signaling that the unlock had been obtained. The tone change is caused by the increased amount of current flowing through the buzzer when the traffic lever



The Generator and Selective Switch

is moved to the full reverse position opening the indication contact and closing the reverse contact, causing current to flow over the push button wire to the common wire.

It will be noted that the exciting current of the generator field is carried over a normal contact of the traffic levers. It is, therefore, impossible to generate current unless the traffic lever is normal, which insures that the unlocking energy must in all cases come from the generator at the other tower. As a further check it is mechanically impossible to raise the indication latch except when the lever is at the center or indication position.

Traffic locking has also been installed between Hurricane,

W. Va., Milton and Barboursville, a distance of 20 miles, on double track, for operation of trains in either direction on signal indication. Electric and electro-mechanical interlockings with signals arranged for reverse traffic operation are located at the above points. Traffic is diverted with a minimum reduction of speed by the use of No. 16 crossovers. The circuits and the operation of the apparatus are the same as on the first installation. This installation has not been in service long enough to determine how great a saving has been effected. However, it is proposed to make a further extension of the installation for about 20 miles.

The foregoing method of locking between towers was developed by members of the signal department of the Chesapeake & Ohio. The apparatus was developed and manufactured by the Union Switch & Signal Company and is covered by patent rights.

Tentative Valuations Issued

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on June 29, issued a tentative valuation of the property of the Central of Georgia and its subsidiaries, in which the final value of the property used by the Central of Georgia including its leased lines was stated as \$79,083,523 and that of the property owned as \$64,231,034 as of the valuation date, June 30, 1915. The outstanding capitalization as of that date is stated as \$57,037,350. The property used covers 2,530 miles and the property owned 1,992. The investment in road and equipment as stated on the company's books is given as \$62,003,324. The commission reports that the original cost cannot be ascertained. The cost of reproduction new of the carrier property other than land is reported as \$75,428,870 for the property used and \$62,252,124 for that owned. The cost of reproduction less depreciation for the property used is given as \$58,826,776 and of that owned as \$48,139,304. The present value of the lands owned is given as \$11,512,915 and the excess cost of acquisition of the land as \$8,801,022. The value of materials and supplies was given as \$1,306,992.

The Interstate Commerce Commission on June 27 made public about 50 supplemental tentative valuations, in which, "after a careful consideration of all the facts contained in the tentative and supplemental tentative valuations, including the excess cost of carrier lines, appreciation, depreciation, going concern value and working capital and materials and supplies, and all other matters which appear to have a bearing upon the values reported," it proceeds to state the final value of the property owned and used and used but not owned devoted to common carrier purposes. The figures given for the final value of the property used as of the valuation dates, June 30, 1914, 1915 or 1916 are as follows:

Tunapah & Tidewater.....	1915	\$2,658,128
Bowdon	1915	110,383
Georgia, Southern & Florida.....	1915	9,860,191
Georgia Northern	1915	877,868
Death Valley	1915	357,546
Dover & Southbound.....	1914	170,000
Carolina	1914	169,680
Hampton & Branchville.....	1915	198,124
Arizona Southern	1915	332,288
New Mexico Midland.....	1916	140,265
Sylvania Central	1915	150,882
Texas Midland	1914	3,096,851
New Orleans, Texas & Mexico.....	1914	7,495,969
Elgin, Jcliet & Eastern.....	1914	39,049,162
Wrightsville & Tennille.....	1915	1,597,924
Toodle Valley	1915	229,494
Alabama Central Railway.....	1915	78,095
St. John & Ophir.....	1915	123,951
Missouri Southern	1914	920,093
Ray & Gila Valley.....	1915	627,593
Quincy Western	1915	62,213
Norfolk Southern	1914	24,663,840
Farmers' Grain & Shipping Co.....	1914	742,822
Brandon, Devil's Lake & Southern.....	1914	170,000
Mississippi Railroad	1916	576,632
Cape Girardeau & Northern.....	1914	1,257,716
Potomac, Fredericksburg & Piedmont.....	1916	561,234

Evansville & Indianapolis.....	1915	2,250,291
Santa Fe, Raton & Eastern.....	1916	226,227
Savannah & Northwestern.....	1915	1,817,271
Northern Dakota.....	1915	180,468
Talbotter.....	1915	78,957
Joplin Union Depot.....	1914	586,708
Cimarron & Northwestern.....	1916	226,810
St. Francois County.....	1914	190,190
Mississippi River & Bonne Terre.....	1914	3,551,685
Hawkinsville & Florida Southern.....	1915	895,226
Alabama Northern.....	1914	92,400
Central Ry. of Arkansas.....	1916	201,924
Kinston-Carolina.....	1914	160,841
Flint River & Northeastern.....	1915	236,755
Carolina & Yadkin River.....	1915	766,538
Rome & Northern.....	1915	283,425
Greene County.....	1915	152,977
Tampa & Jacksonville.....	1915	500,000
Mississippi Eastern.....	1915	227,229
Macon & Birmingham.....	1915	1,646,967
Albany Passenger Terminal.....	1915	138,901
Louisville & Wadley.....	1915	145,201

The commission also served eight tentative valuations giving the corporate history, cost of reproduction new, cost of reproduction less depreciation, original cost, etc., and also the final value as follows:

Bristol.....	1917	108,600
Kennebec Central.....	1916	70,700
Bullfrog & Goldfield.....	1915	1,463,276
Washington, Potomac & Chesapeake.....	1916	853,750
Fellsmere.....	1916	110,000
Goldsboro Union Station.....	1914	145,000
Hardwick & Woodbury.....	1916	237,906
Menson.....	1916	77,113

The commission has also issued tentative valuations giving the final value of the property used as follows:

Smoky Mountain 1915.....	143,794
Norfolk Terminal 1915.....	1,007,387
Spokane and British Columbia 1915.....	722,423

Freight Station Section of A. R. A. Holds First Meeting

Former Freight Agents' Association Discusses Means of Reducing Claims and of Operating Houses

HOW TO IMPROVE the station service so as to eliminate many of the errors which are resulting in freight claims, was the principal problem which came before the Freight Station Section, Division I—Operating, of the American Railway Association, at its first annual session, which was held at the Hotel Sherman, Chicago, from June 21 to 23. More than 250 delegates attended the meeting, which was the first since the former Association of Freight Agents amalgamated with the American Railway Association. It was apparent in the discussion of the various subjects which came before the meeting, that those present had in mind the necessity for devising means of cutting down the 1920 freight claim total of \$109,000,000. In addition, it was manifest that the terminal freight agents are in an excellent position to know how this end can be accomplished. Representatives of the Freight Claim Section, A. R. A., as well as visitors from the Railway Accounting Officers' Association, attended throughout the sessions.

A noteworthy feature of the meeting was the presentation of most of the reports by topic. It had been decided that interest would be stimulated and a nation-wide viewpoint obtained, if various local freight associations throughout the country would prepare analyses and recommendations on specific topics. These papers, after being read from the floor, were thrown open for general discussion and action of the gathering.

Opening Address by R. H. Aishton

The session was opened by the chairman of the division, C. E. Fish, terminal agent of the Baltimore & Ohio, at Cincinnati, Ohio. Mr. Fish introduced R. H. Aishton, president of the American Railway Association, who said in part:

"There is no factor that is going to be more prominent in the proper settling of the future of the railways than the public's attitude toward them. There is no body of railroad officers or employees which comes in contact with the public as you in this room do, or that is going to be such an important factor in maintaining that public interest in the welfare of the railroads, and that right conception of the railroad transportation situation. Nearly every step in transportation, the solicitation of the freight in the first place, the receipt of it, the seeing that the freight is in good order when it is received, the handling of it from the shipper to the car in which it is transported, the selection of the car in which the freight is transported, its receipt at the other end of the road, the decision that a claim shall be paid or refused, the collection of the revenue, the accounting of

the whole transaction from one end to the other, and the final delivery to the man at the other end, are all in your hands. You have eight or ten different points of contact with the public at either end. A failure to handle a shipment in an efficient and courteous manner results in an enemy for the transportation interests of this country, and what the transportation of this country needs is friends. You are in a position to get them.

"A year before the war, the claims on the railroads for freight, no personal injuries or anything of that kind included, amounted to about \$35,000,000. The last year of federal control, \$106,000,000 was paid out in claims; and last year, in spite of our utmost efforts, the total reached \$109,000,000, and the word that comes from the Freight Claim Prevention Committee is that it will be \$125,000,000 this year. If it had not been for the freight claim prevention movement and for the efforts of the individual railroads, we might have had claims amounting to \$120,000,000 last year, instead of \$109,000,000, and this year, instead of the total being \$130,000,000, it might have been \$160,000,000."

Report of Committee on Operating

Two subjects of considerable importance were presented in the report of the Committee on Operating. The first was a paper by the Chicago Association on the "Tractor Method of Handling L. C. L. Freight." It was the consensus of opinion that the success or failure of tractors in this work depends entirely upon the conditions existing at the individual station. In some instances it was established that the use of tractors enabled the stations to load more cars than would otherwise have been possible, while in other cases, where the station itself had not been constructed for this method of operation, the tractors had been a failure. The subject was finally referred to the incoming Committee of Direction, with the provision that the use of tractors was to be recommended only in specific cases where justified by the prevailing conditions, and was not to be favored as a general practice.

The second section of this report, which received considerable attention, dealt with the problems of improving the receiving and delivery personnel at the various stations. This matter had been referred to the Freight Station Section by the secretary of the Freight Claim Division. A majority of the delegates were agreed that while the positions of receiving and delivery clerk are of first importance to the success of handling freight, it has become difficult to secure efficient men for the work for a number of reasons, first among which was the compensation. It appeared from the

discussion that in many instances it was futile to train men carefully for the work, since they were certain to be attracted by the higher pay in other lines. Another difficulty, it seemed, is the lack of avenues for promotion for the man of intelligence and training as an inducement to enter the station service. It was recommended, in consequence, that the incoming Committee on Operating handle the matter directly with the Freight Claim Section.

Report of Committee on Topics

The remainder of the time was devoted to the report of the Committee on Topics. To facilitate the effective handling of the committee's work, it had been divided into five general classes, as follows: (1) Freight Claim Prevention; (2) Station Settlements; (3) Station Traffic; (4) Operating; (5) General Topics.

It was found possible to refer back a large part of the topics for further investigation and report at the next session. Considerable interest, however, centered around the subject of freight claim prevention as brought out by an article prepared by the Chicago association, dealing with the causes and means of preventing losses of entire packages. The paper presented an exhaustive survey of the conditions, which might result in this type of claim, compiled in the general order of the freight movement, commencing with the errors occurring in the preparations of the package for shipment, and ending with the causes for claims through faulty delivery of the freight to the consignee. The meeting held that two causes in particular could be blamed for the heavy losses of entire packages. One was the faulty sealing devices generally used. For instance, it was established that many seals can be manipulated in as many as 19 different ways. Another cause of trouble, it was agreed, is the comparative ease with which many box car doors can be tampered with. These matters were turned over to the Committee of Direction, with specific instructions to endeavor to establish a higher standard through co-operation with the A. R. A.

Bonding Receiving Clerks

The St. Paul Association also presented a topic dealing with the proposal to bond receiving and delivery clerks. A part of this paper follows:

"It is claimed that our receiving and delivery clerks are the primary cause of the loss of entire packages, first, in delivering through a house more packages than the billing calls for, and second, in receipting for packages not actually received. Granting that the men do sign or deliver packages as stated above, what action on the part of the officer in charge will minimize the claims from this source? A constant change of employees is not going to bring about the desired results, as a new man has a much greater chance to make this kind of mistake than an older and more experienced man. Constant reminders to the men on this subject will no doubt help greatly. We recommend the bonding of this class of employees to protect the company in case of loss. In addition, this would tend to make the men in charge of these duties much more careful. The method has been tried out in some of the larger stations and found very satisfactory."

The division of opinion on this matter necessitated further investigation and action by the Committee of Direction.

At the final session of the Division, the location of the next meeting was left to the incoming Committee of Direction for decision. At the election of officers, J. C. Gilmore, agent of the Pennsylvania at Philadelphia, and chairman of the former Association of Freight Agents, was elected chairman; C. M. Teschemacher, general agent of the Chicago & Alton, at Chicago, was elected first vice-chairman; H. W. Maynard, Jr., agent of the Central of New Jersey, at Pier 10, North River, New York, was elected second vice-

chairman, and R. O. Wells, agent of the Illinois Central at Chicago, was re-elected secretary. In addition to C. E. Fish, former chairman of the Division, and E. L. Kemp, general agent, Union Stock Yards, Chicago, who will serve as hold-over members, the following were elected to the Committee of Direction: L. J. Brinkman, general agent, Michigan Central, Detroit, Mich.; E. J. Coffey, agent Southern Railway, East St. Louis, Ill.; C. Treat Spear, agent Chicago & North Western, St. Paul, Minn.; Frank Laughlin, agent Erie, Cleveland, Ohio; J. R. Hitchcock, assistant agent, Santa Fe, Kansas City, Mo.; J. L. Harrington, agent Chicago, Burlington & Quincy, Omaha, Neb., and C. E. Cochrane, agent Pennsylvania, Baltimore, Md.

Seasonal Coal Rates

WASHINGTON, D. C.

THE FRELINGHUYSEN seasonal coal rate bill has been intermittently debated in the Senate for the past week. Senator Frelinghuysen made a long speech on the bill, which he illustrated with charts hung around the walls of the Senate to illustrate the seasonal and yearly fluctuations in the coal business, and he argued that the country is facing a calamity in the coal situation unless steps are taken to stimulate production early in the season.

"The bill aims," he said, "to overcome the present seasonal irregularity in the production and transportation of coal by encouraging the purchase of coal in spring and summer for storage against fall and winter. The bill leaves the widest discretion to the commission in the application of the principle of seasonal rates. Rates may be promulgated to affect the carriers as a whole or to affect differently individual coal fields or rate groups. The commission is, however, instructed so to adjust the seasonal differential that the carrier will receive the same annual revenue as if no seasonal variations were provided."

The Senator said that the months of March, April, May, June and July are low points of production, the output amounting to 21,000,000 tons. The purpose is to take the 21,000,000 tons off the autumn and winter months, the high point of production, and equalize it by increasing the production in the summer months. Senator Willis asked if the benefit of the reduction would not go to the large consumers who have facilities for storing coal, while the small consumer would have the disadvantage of the higher rates in the winter time. Senator Frelinghuysen thought that the storing would be done by the wholesale or retail dealer and that the consumer would get the benefit. Senator Smoot said that a seasonal price on coal has been in effect in Utah for years and while it tends to promote the buying of coal in the summer time, the reduction is just about offset by the cost of storage and handling. Senator Kellogg pointed out that cash coal in Illinois and Indiana has recently been selling for 50 cents to a dollar a ton cheaper than coal for delivery late in the season but that did not cause the mines to be run to capacity. Senator Frelinghuysen said that there are now 150,000 coal cars idle and if the railroads could utilize them now for hauling coal the work would be done at lower cost than if the hauling of the coal were postponed. He said the people are not buying coal now on account of the present freight rates, but the lowering of the freight rates would, in his opinion, induce them to buy. Senator Jones of New Mexico said that one difficulty is that there is no stabilized market in the bituminous coal industry and that even if there were a reduction of 25 or 50 cents a ton at a given time the consumer would not know whether that would represent a lower price than would be available later. Senator Pomerene pointed out that coal cars are frequently used in the summer time for the handling of construction and road-building materials, but that there are many other consider-

ations that enter into the question besides the rate on coal. "It looks to me," he said, "as if that would be simply a homeopathic dose, the benefits of which are not going to trickle through the fingers of the dealers to the consumers."

Senator Cummins said he feared some senators are looking at this proposed legislation from the point of view which is hardly warranted. He saw nothing in the bill that will reduce the price of coal, but thought the general purpose of the legislation is an economic and industrial one to enable the coal industry to dismiss 25 per cent of the miners who are employed in the mines 230 days in a year, but who must be maintained at or near the coal mines because at certain seasons of the year there is a demand for the entire capacity of the mines. He would not say that a reduction in freight rates would fully accomplish the object but thought no objection could be found against reposing the authority in the Interstate Commerce Commission.

"I assume," he said, "that if the dealer finds that he can store the coal in the summer and save money he will do it and he will have his coal stored, but I am not convinced that he will reduce the price to the consumer on that account. At any rate, the bill cannot increase the price of coal to any one."

Reference was made to the 28 cents a ton reduction in the rate of lake cargo coal and Senator Frelinghuysen read a letter from Chairman Clark of the Interstate Commerce Commission describing the purpose of the reduction as being largely to correct a competitive adjustment of the rates with relation to the rates from Illinois and Indiana. The Senator also read another letter from Chairman Clark approving the purpose of the bill. He also replied to arguments that many kinds of coal cannot be stored by saying that a large amount of coal is ordinarily stored on the lake docks and that at the end of the war there were some 63,000,000 tons of coal in storage. He also argued that a more even distribution of the coal shipments would reduce the number of coal cars which some of the railroads are obliged to own to accommodate the peak movement. The passage of this bill, he said, with the definite announcement of a seasonal cut in freight rates to be followed at a specific date in the autumn by a restoration of the present rate, would clarify the situation greatly. It would put an end to speculation as to what is going to happen to the transportation cost of coal and would result in the placing of thousands of orders at the mines.

Senator King asked whether Senator Frelinghuysen would consent to an amendment of the bill striking out the words which direct the commission to maintain rates which will provide as nearly as may be the same annual revenue as rates without seasonal variation. Senator Frelinghuysen said he would oppose such an amendment. Senator King asked if it would be an advantage to the railroads to haul the coal in the summer time why they should receive an increased rate in the winter time. Senator Stanley made a similar argument and offered an amendment to the bill to strike out the provision for a corresponding increase in the winter rates. This was opposed by Senator Kellogg, who said it would destroy the effect of the bill.

Senator Underwood of Alabama made a speech against the bill, on the ground that it would constitute another example of government regulation of business and he was unwilling to place so much power to regulate the movement of coal from various districts in the hands of a commission at Washington that might not be in touch with the local conditions. To illustrate this point, he said that during the war three successive officers in the Fuel Administration cut off the coal supply of one of his constituents who needed only 10 tons of coal a month to operate a steam shovel to furnish molder's sand for a number of iron furnaces. On three separate occasions this coal supply was cut off on the ground that sand was used only for houses and it was the policy

of the government to restrict the building of houses during the war. Three times the senator had had to go to the Fuel Administration, he said, and get them to look at the inside of the file to ascertain that the sand was to be used for molding purposes. He also objected to the bill on the ground that it would penalize the domestic consumer who buys his coal in the winter time. Senator Frelinghuysen said that an increase of 25 cents a ton to the man who buys 10 tons of coal would be a small matter if it would prevent the price of coal being run up from \$5 to \$15 a ton because of scarcity.

A number of amendments to the bill were proposed by senators who desired to use it as a vehicle for amendments to the transportation act which they have been unable to get through committee. Senator LaFollette offered a number of bills of this kind, including one to repeal the rate-making provisions of the transportation act and another to prevent the Interstate Commerce Commission from exercising jurisdiction over intrastate rates. Senator Fletcher of Florida took advantage of the opportunity to make a long speech objecting to the present freight rates.

On Wednesday afternoon the bill was referred back to the committee on interstate commerce on motion of Senator Borah by a vote of 36 to 26. The majority vote represents the enemies of the bill and the action is taken as practically killing the bill, as even its friends were not particularly interested in pressing it with the Stanley amendment.

Senator Fletcher was answered at several points by Chairman Cummins of the committee on interstate commerce, who pointed out that many of the effects which the Senator had attributed to high freight rates were due to other causes.

The Senate on June 28 adopted an amendment which the supporters of the bill declared would practically nullify the purpose of the bill, that proposed by Senator Stanley to strike out the provisions which would authorize the Interstate Commerce Commission to advance the rates during the winter months by an amount corresponding to the reduction made in the earlier months. This was adopted by a vote of 33 to 27 after Senator Frelinghuysen had read a letter from Chairman Clark of the Interstate Commerce Commission saying that the amendments proposed by Senators Stanley and King would weaken or complicate the legislation and its administration. He had been authorized by the legislative committee of the commission to say that the amendments are not in harmony with the purpose of the proposed legislation and that there are valid objections to the adoption of any of them.

What Is a "Living Wage"?

CITING MANY INSTANCES where governors and other high state officials receive lower wages than do engineers, firemen and even negro flagmen on the Nashville, Chattanooga & St. Louis, Fitzgerald Hall, general counsel of that road, in testifying recently before the Railroad Labor Board in a plea for wage reductions exploded a bomb under labor's theory of the "living wage."

"Railroad employees, as a whole," Mr. Hall said, "earn as much, and in some instances more, than the best trained men holding positions of greatest trust and responsibility in the four states through which we operate. The claim that any reduction will deprive railroad employees of a living wage or 'enough to live according to proper American standards is refuted by the facts."

"When our judges, college and university professors, high school and grammar school teachers, preachers, policemen and fire fighters receive, as a whole, very much less than railroad employees, as a whole, there can be no just claim that a reasonable reduction in compensation will deprive railroad employees of a proper living wage."

"A few examples will be illuminating. The principal of

the high school at Nashville, the capital of Tennessee, the educational center of the South, received \$250 per month, while yardmasters receive \$305 per month. High school teachers at Paducah, Ky., receive \$125 per month; at Chattanooga, Tenn., \$148 per month; at Huntsville, Ala., \$125 per month, while our blacksmiths receive \$185.51 per month and our yard switchmen \$188.56 per month. The average Presbyterian preacher in the South is paid \$1,600 per annum—less than one-half the earnings of yardmasters and passenger engineers; \$662.72 less than yard switch tenders.

"Vanderbilt University at Nashville pays its full professors \$3,750 per annum; the University of Tennessee at Knoxville \$2,684 per annum; the Georgia School of Technology at Atlanta \$3,600 per annum, while the conductor on our Rome branch, 18 miles long, receives \$5,735.88—a sum greater than that received by the judges of the Supreme Court of the State of Tennessee. Assistant professors and instructors in these colleges and universities receive a maximum of \$2,250 per annum—less than a car inspector receives—less than the baggageman on a passenger train receives.

"The judges of the Supreme Court of Tennessee are paid \$5,500 per annum, yet the engineer on our Rome branch, 18 miles long, receives \$5,997.04 per annum. The negro flagman and porter on our Columbia-Decherd branch train receives \$3,146.40 per annum, being \$146.40 more than the district attorney generals of the State of Tennessee, public prosecutors of the state, receive. The fireman on our Columbia-Decherd branch train receives \$3,925 per annum, being \$425 more than the assistant attorney general of the state of Tennessee, the man who represents the people of the state before its Supreme Court in practically every criminal case.

"The engineer on our Tullahoma accommodation receives \$4,371.92 per annum, being \$371.92 more than the salary of the governor of the state of Tennessee. The engineer on our Tracy City branch receives \$373 per month, a sum which is more than either the chief of police or chief of the fire departments at Atlanta, Ga., Memphis, Nashville and Chattanooga or Paducah receive. The fireman on our Pikeville train receives \$291 per month—more than twice as much as any fireman in the fire-fighting service in any city on our entire system is paid. The circuit judges and chancellors of Tennessee are paid \$4,000 per annum, which is over \$100 a year less than the conductor on our Tracy City branch is paid.

"These and similar facts refute the claim that either the

cost of living or maintenance of a proper living wage justify the present enormous wages paid to some classes of railroad employees."

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING for the week ending June 18 showed a decrease of 8,256 cars, as compared with the week before, the total number of cars loaded with revenue freight being 780,741, as compared with 916,736 in 1920 and 807,907 in 1919. The reduction was principally accounted for by the decrease in coal loading.

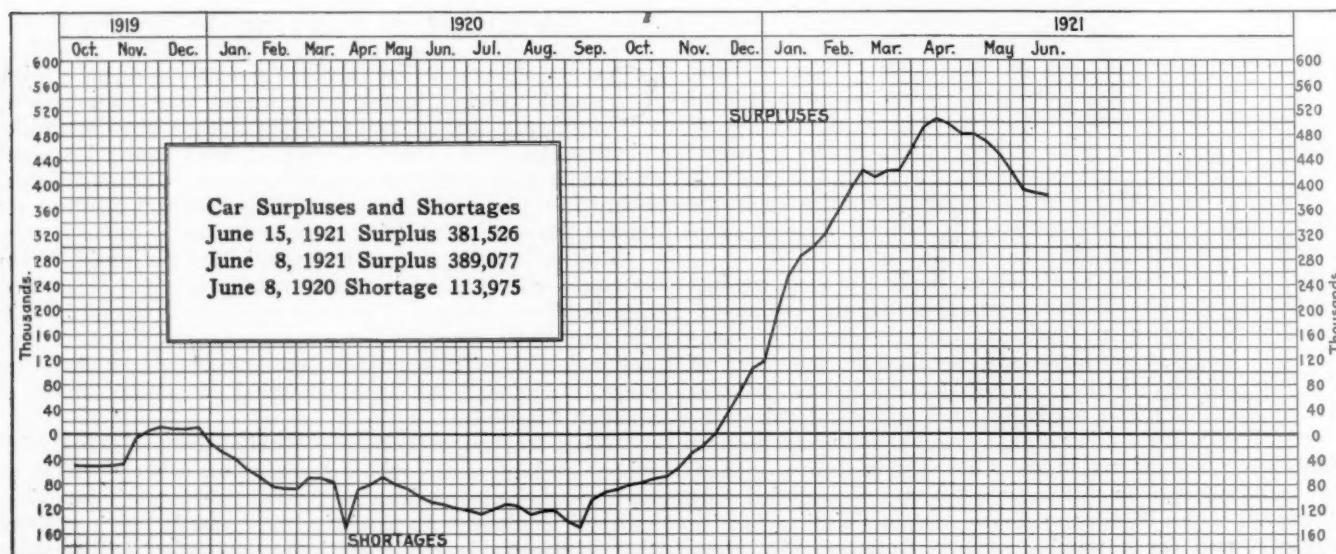
The report showed 157,243 cars loaded with coal during the week which was 5,845 cars less than were loaded during the previous week and 31,595 below the total for the corresponding week last year. It also was approximately 15,000 cars below the number loaded during the corresponding week in 1919. A total of 20,101 cars of coal were moved into Lake Erie ports for shipment up the lakes as compared with 19,767 cars the week before.

During the week 28,866 cars were loaded with ore which was a reduction of 1,313 compared with the week before. The loading of grain and grain products totaled 40,994 cars, live stock, 28,541 and forest products, 50,472 cars, all of which were slightly below the preceding week. Loading of merchandise and miscellaneous freight, which includes manufactured products, totaled 469,523, an increase of 228 cars over the week before, but more than 50,000 cars below what it was during the corresponding week one year ago. An increase of 314 cars was reported for coke, bringing the total for the week to 5,102 cars.

Compared with the corresponding week in 1920, the loading of grain and grain products was the only commodity to show an increase.

Slight increases in the number of cars loaded with freight were reported in the Pocahontas, Northwestern, Central western and Southwestern districts compared by regions with the previous week but a decrease of 5,500 was reported in the Eastern, 3,700 in the Allegheny and 1,100 in the southern districts. Except for the Pocahontas all were less than during the corresponding week in 1920.

The chart shown below has been compiled by the *Railway Age* to show the trend of net car shortages and surpluses for the past year and a half:



Curve of Net Car Surpluses and Shortages



Fig. 1. Sambre Bridge. The Trestle Bridge Replacing the Temporary Structure in Fig. 2.

War Left Belgian Railways in Fair Condition

Damage from Undermaintenance and Aerial Bombing—
Improvements Planned and Made Since Armistice

By Oliver F. Allen

Formerly Major of Engineers, American Expeditionary Forces

THE fact that the greater part of Belgium was in the hands of the Germans all during the war and was not the theater of action was of material value in safeguarding the railways from the wholesale destruction which was their lot in northern France. The lines of most of the Belgian railways suffered very little from military destruction prior to the last weeks of the war. Near some industrial and transfer centers there were isolated cases of successful allied air raids and occasionally a German supply train was blown up by airplane bombs with coincident injury to the tracks, but devastation of that sort was easily repaired by the army of occupation. In the western part of Flanders including the Ypres sector, held by the Allies, the railroads were destroyed very much as in northern France, and some extensions were made for military purposes such as those from Dunkirk which were used for supplying the British army in Flanders. There was also extensive war destruction in the industrial district around Mons. The Germans worked the Belgian railways very hard during the war, and naturally made the minimum of repairs, so that the condition of both roadbed and rolling stock was very bad when the Boches moved out.

When the tide turned in the fall of 1918, the Germans destroyed the railways while retreating, as effectively as the time at their disposal permitted, and succeeded in injuring very seriously the lines going down the Sambre and Meuse valleys toward Charleroi and Namur. Much of the track and several bridges between Brussels, Antwerp and Ghent were also destroyed. For miles at a stretch they blew up the tracks in such a way as to injure the roadbed and twist the rails into the most fantastic shapes, making them absolutely worthless for relaying. There was a great deal of such wanton destruction of no military value.

As the Germans fell back the Belgian, British and French army engineers built temporary military bridges and recon-

structed lines to permit transportation of supplies for the rapidly advancing armies along the entire Belgian front. Following the armistice the railroads were used to carry the British army of occupation to Cologne and to provision it there, and as soon as possible the American army of occu-



Fig. 2. Temporary Wooden Bridge Over the Sambre River on the French Northern Railway Line, Running from the Frontier to Charleroi in Belgium. Note the Debris from the Old Bridge, at the Left of the Picture, to Be Utilized for the Reconstruction

pation at Coblenz was supplied over the Belgian railways from Antwerp, thus relieving the French railways across the devastated regions of that burden.

In accordance with the armistice, the Germans turned over

to the Belgians a great many freight and passenger cars. A Belgian train during the first year after the armistice was often a mixture of Belgian, French, German and English, and in the case of freight trains, American cars. While the Germans did turn over this large lot of cars they did not send any repair parts with them and the matter of maintenance became very serious. There were many exasperating delays due to accidents to the Boche cars and the difficulty



Fig. 3. Another Sambre Bridge in Belgium. Temporary Trestle for One Track While the Permanent Bridge, at the Right of the Picture, Is Being Rebuilt. Here Both Piers and Abutments Are of Masonry

of setting them out so that the rest of the train could go on. This enemy material has been of much less real use than its tabulation would indicate.

Considering the fact that all Belgium was occupied and used to the utmost by the enemy for over four years, and so



Fig. 4. Sambre Bridge. The Temporary Wooden Structure Shown in Fig. 3 Replaced by a Military Single Track Girder to Permit the Passage of Barges on the River. The Permanent Girder for the Other Track Is Already in Place

was left without the opportunity to plan and start reconstruction like the French, the railway administration and personnel deserve the highest praise for the rapidity with which they were able to resume operations and the promptness with which they moved freight even during 1919. The Belgians were not only able to restore their lines and rebuild their bridges, but to go ahead with the reconstruction of

stations and continue some general improvements planned before the war. This included such things as the rebuilding of the passenger station at Ghent with the entire elimination of grade crossings, improved arrangement of tracks, etc., the project for greater and better terminal and transfer facilities at Brussels and extensions into the new coal fields in the Limbourg district in the Meuse Valley.

The Belgian Government began rebuilding steam locomotives almost immediately after the armistice, utilizing (as is illustrated in Fig. 3, showing the Societe d'Electricite et de Mecanique factory at Ghent) some industrial plants which had not been used for locomotive work before the war. Later they purchased a number of American locomotives and placed contracts for a great many new cars.

While the restoration of the luxuries of passenger travel moved at about the same rate as in France, and the restrictions of poor fuel, roadbed, etc., kept the speeds very much



Fig. 5. Assembly Room of the Ghent, Belgium, Factory Showing Societe d'Electricite et de Mecanique on April 1, 1920, in a Plant Which Has Been Used for Building Steam and Oil Engines Before the War and as an Artillery Repair Shop by the Germans During the War. It Is Now Again Building Oil Engines and Has Started the Production of Electrical Machinery

below pre-war standards, the general restoration of the railway service was perhaps quicker in Belgium than in France. The Belgian railways have not suffered as much as the French from shortage of fuel, although they have been troubled almost as much by its poor quality and it has, perhaps, been easier for the Belgians to get the labor needed for reconstruction work than has been the case in France.

A Report on the Railroad Situation

A REPORT ON GENERAL economic conditions in America submitted to the International Chamber of Commerce by the American committee of which A. C. Bedford, of the Standard Oil Company, is chairman, contains the following on the railroad situation:

"Such improvement in general business conditions and sentiment as has occurred since the first of the year, has been clouded to a considerable extent by the financial difficulties in which most of our railroads are now involved. It was known that during the time when their income was guaranteed most of the roads were not paying their way, and it was evident that difficulties would arise when the guaranty came to an end. Unfortunately, when this time arrived, business was on the down grade; and naturally railroad earnings were

seriously affected. While the cost of coal and other supplies has declined to some extent, wages have remained at the war level; and it has been impossible to cut down the number of employees sufficiently to reduce payrolls to the requirements of the situation.

"The first quarter of 1921, instead of bringing relief, saw matters go from bad to worse, and developed a situation that seemed to portend an era of receiverships even more serious than that which followed the panic of 1893.

"Fortunately, since the first of April there have been developments which promise relief from excessive labor costs; but, even now, it is a question whether changes can be made in time to avert a number of receiverships. It is a serious defect of our methods of regulating public utilities that relief from intolerable conditions can seldom be secured before deterioration of service and actual or impending bankruptcies force our regulating bodies to appropriate action.

"The present situation is that the country does not want government ownerships of railroads, and that relief from exorbitant wage demands must be had if government ownership and operation (at a huge deficit) is to be averted. Recent developments indicate that relief may be at hand, and justify a more hopeful view of the situation than it would have been reasonable to entertain a few months ago. Relief may not come in time to prevent some receiverships, but there is reason for hoping that it may be secured in time to avert a general collapse of railroad credit. If the next six months can bring a solution of the problem, they will dispel one of the most ominous clouds that now darken a difficult business situation."

A New Idea In Ticket Cabinets

THE IMPROVED TICKET CASES introduced in the Grand Central Terminal, New York City, two years ago, and described briefly in the *Railway Age* of April 11, 1919, page 964, were but the beginning of a development which has now been amplified into an elaborate system of ticket office

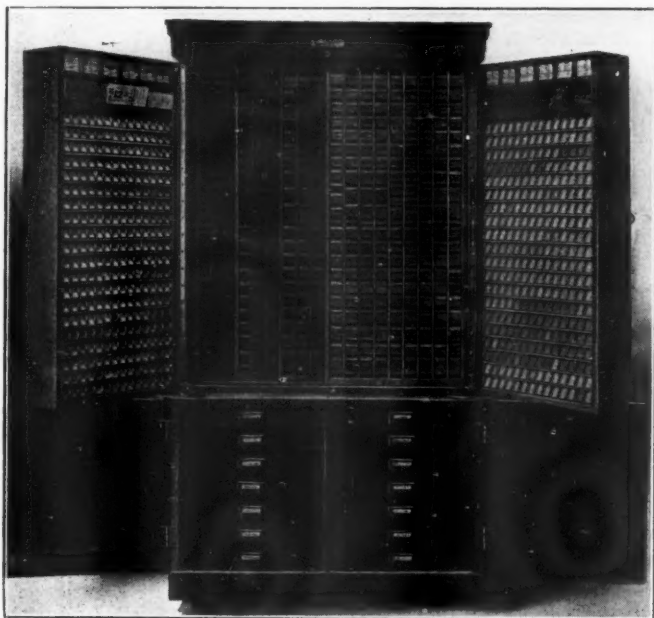


Fig. 1.—Individual Ticket Case Holding 6600 Forms

equipment; and the manufacturers—the Ticket Office Equipment Company, Grand Central Terminal, New York—have made cabinets and other furniture for offices in Chicago, Cleveland, Montreal and other cities which, like those in New York, have demonstrated marked economies for the railroads

and at the same time have ameliorated the condition of the hurried or worried ticket buyer.

It will be recalled that the primary idea was to provide each individual seller, in a large office, with a complete stock of railroad and Pullman tickets, and at the same time a ready means of transferring his job (at the same window), to the

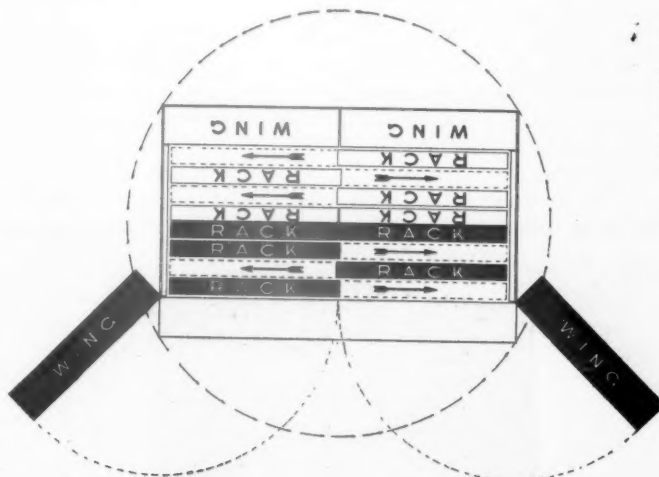


Fig. 2.—Plan of Cabinet Shown in Fig. 1

relieving clerk with no interruption of sales for the purpose of auditing or cash-counting.

The illustration, Fig. 1, shows the general appearance of the cabinet. It is in general the same as was described in the former account, the principal changes since made being



Fig. 3.—A Stack of Folded Tickets

the substitution of metal partitions and other parts, in place of wood, and the construction of two cabinets in one, back to back, as illustrated in the plan, Fig. 2. The different sections slide laterally, and those shown in the perspective (with only a part of each section in view), can each be brought fully

in view by sliding, as indicated in Fig. 2. The entire cabinet revolves on corner casters and a ball bearing center pivot, so that either one of the two stocks of tickets may front the selling window, as desired. The change of front can be made in a moment. Each ticket window thus may be in service two shifts each day, without auditing. The alternate closing of the two stocks allows ample time for making up the day's report and for replenishing stock.

The wings may be opened to any desired angle and the panel doors in front of the drawers in the lower part are connected to the wings above by a channel and pin device so that opening and closing the wings at the same time opens or closes the lower doors. Coupon tickets are machine folded so that they are stacked in vertical compartments in the same way that ordinary card tickets are stacked. The drawers in the lower section are for miscellaneous tickets, rubber stamps



Fig. 4.—Cabinet for Medium Size Station

and stationery. The cabinet shown has a capacity of 1,300 forms of local and Pullman tickets and 2,000 forms of interline and miscellaneous tickets in the side which is in view, and the other side has the same, making in a duplex cabinet a total capacity of 6,600 forms.

The sections of the cabinet devoted to interline tickets consist of vertical racks in which the shelf or horizontal part can be adjusted to different heights to provide for ticket stocks of different size. For example, where 100 tickets are to be kept in stock, the space may be double that allowed for a station which requires only 50 tickets. Interline tickets, of whatever length, are folded by machine to a uniform coupon size, 1½ in. wide, and are kept in stacks as just noted. The folds can be instantly shaken out by the seller, when necessary to write or stamp on the coupons. The cost of folding is said to be no more than that of punching a hole in each ticket as is required in the old style of ticket case where the tickets are hung on pegs. Tickets which are folded keep much

cleaner than is common in the old fashioned racks. The folded system requires only a fraction of the space needed by the old style.

The illustration, Fig. 3, shows, but rather imperfectly, a single stack of folded tickets, one side of the partition being removed. The part holding the label is pivoted, and, when a ticket is pulled out, is pressed outward and downward.

The tin tube containers have a flexible spring lip which is opened by a slight downward pressure of the finger on the

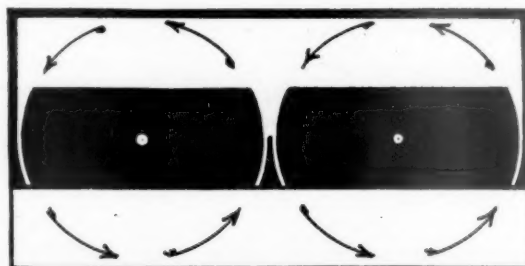


Fig. 5.—Plan of Medium Size Cabinet

front ticket. A ticket which may have been withdrawn by mistake may be quickly replaced. In place of the common marble follower a light wedge is used.

The Ticket Office Equipment Company makes cabinets of various sizes, for large or small stations. For a medium sized station a revolving cabinet is made on the plan shown in Fig. 5. The appearance of this smaller cabinet, when closed, is shown in Fig. 4. One of the two rotating sections is devoted to local and Pullman tickets, and the other to interline and miscellaneous tickets.

The efficiency claims of the makers are summarized as



Fig. 6—Rock Island Ticket Office, Chicago

follows: All sellers are trained for universal selling service and not limited to special forms only. Elimination of uncomfortable enclosed booths, increasing the morale and therefore the energy of the seller. All windows utilized all the time if required. All tickets at each and every window. Each passenger completes all transactions with one seller at one time. In emergency, as all cabinets are mobile units, a complete ticket office can be transferred to any point and immediately opened up for business. The floor space required for the old style miscellaneous types and sizes of cases is ten times greater than this equipment carrying the same number of forms. All tickets are within arm's length of the seller.

General News Department

The Chief Interchange Car Inspectors' and Car Foremen's Association convention for this year has been postponed.

The Erie Railroad is preparing to try an automatic train stop of the intermittent electrical contact type, and expects to make tests within the next two weeks. The apparatus is being put in position on the Northern Railroad of New Jersey, near New York City.

The Veterans' Association of the Lackawanna Railroad held its sixth annual reunion at Scranton, Pa., on June 19. The members of this association are those who have been in the employ of the road for 20 years or more; and more than 1,000 were present at the reunion. The president of the association for the ensuing year is John Draney, Jersey City, N. J.

The Tennessee & Cumberland River Railroad, on which regular traffic was long since suspended, is to be finally abandoned, and its track is being torn up. This road connects with the Louisville & Nashville at Tennessee Ridge, Tenn., about 100 miles west of Bowling Green, Ky., and extends thence 14 miles northward to Bear Spring. It was built to develop the timber and mineral properties of the Cumberland River Land Company.

Chairman Clark of the Interstate Commerce Commission has sent a letter to Chairman Norris of the Senate Committee on Agriculture opposing a provision in the bill for the creation of a billion dollar corporation to finance agricultural exports under which the proposed corporation would be authorized to negotiate with the railroads for reduced freight rates on shipments in which it is interested. Mr. Clark said the commission could not endorse any proposal to make the government directly or indirectly a preferred shipper when it is directly or indirectly in commercial competition with citizens who are attempting to carry on the same line of business. Senator Norris in discussing the letter said it would be easy for the commission to remove any such discrimination by reducing the freight rates on the other shipments.

Railway Earnings for May

Preliminary compilations of the returns of 119 railroads operating 150,000 miles to the Interstate Commerce Commission for May show a net operating income of \$21,000,000 as compared with a deficit in May last year of \$6,512,000. The operating revenues of these roads were \$318,000,000, a decrease of 1.2 per cent and the operating expenses were \$268,000,000, a decrease of 14.2 per cent.

Portraits on Tickets

The New York Central announces that buyers of commutation tickets, for use between New York City and certain points 50 miles or more from the city, are to be required to furnish a photograph, to be pasted on the ticket; this to prevent misuse of tickets, which has become common. On the Hudson division this order applies to Beacon and Poughkeepsie; on the Harlem division to Towners and Patterson, and on the River division to Newburgh.

Flood on the Northern Pacific

One of the heaviest rainfalls on record occurred on June 16 in the region traversed by the Northern Pacific, between Medora, N. D., and Hathaway, Mont., a section of road 165 miles long. The nature of the soil prevented the water from being absorbed quickly, and this, together with the steep watersheds, caused a wall of water about 10 ft. high to flow through some of the cuts and along the roadbed in many places. Five section men were caught by the flow in one cut and three were drowned. The tracks were washed out at many points and considerable damage

was done to telegraph lines and signals. The line was reopened for traffic on June 25.

Eastern Railroads to Cooperate in New York Port Problem

At a recent meeting of the presidents of the eastern railways a committee was appointed to work with the New York-New Jersey Port Authority in developing its plans toward the solution of the port and terminal problems at New York. The committee consists of the following 11 engineers: R. C. Falconer, assistant to the president and chief engineer, Erie; Edward Gagel, chief engineer, N. Y., N. H. & H.; G. T. Hand, chief engineer, L. V.; G. W. Kittredge, chief engineer, N. Y. C. Lines East; H. A. Lane, chief engineer, B. & O.; L. V. Morris, chief engineer, L. I.; J. H. Nuelle, general manager, N. Y. O. & W.; A. E. Owen, chief engineer, C. of N. J.; G. J. Ray, chief engineer, D., L. & W.; E. B. Temple, assistant chief engineer, Pennsylvania; and S. T. Wagner, chief engineer, P. & R.

"What Every Employee Should Know"

The Illinois Central has distributed among the workers of that road, a book entitled, "What Every Employee Should Know," which tells how the Illinois Central System had its beginning in 1851, and leads up to the present intensive development of the road. The booklet narrates how the original company was organized and chartered "to build a railroad through central Illinois" and how during the five years following 1851 the charter lines, consisting of 705 miles of road, were completed. The first construction was a 14-mile strip of road between Chicago and Calumet, which was opened to traffic on May 15, 1852. During the next year a 60-mile stretch of road was opened between LaSalle and Bloomington, from which time the southward progress to New Orleans was constant. The road now has more than 8,000 miles of lines representing three and one-half per cent of the total railway mileage of the country; and it serves 15 states.

Accident Investigations—January, February, March

The seventh quarterly issue of the summary of train-accident investigations, prepared by the Bureau of Safety of the Interstate Commerce Commission, for the months of January, February and March, 1921, has been issued. The 23 accidents reported on occurred as shown below, all except the first one being in the year 1921. The derailment of January 3, 1920, has also been made the subject of a special illustrated report, containing studies, made by the engineer-physicist of the commission, of the rail which broke and caused this derailment, and of other broken rails.

TRAIN ACCIDENTS INVESTIGATED, FIRST QUARTER, 1921

		1920	
Derailement	Chicago Great Western.....Wyeth, Mo.....	January 3	
		1921	
Collision	Tonopah & Tidewater.....Dumont, Cal.....	January 14	
Derailement	Denver & Salt Lake.....Tolland, Colo.....	" 24	
Collision	Union Pacific.....Knight, Wyo.....	" 28	
Collision	Illinois Central.....Wilke, Iowa.....	" 30	
Collision	Pennsylvania.....Newark, Ohio.....	February 1	
Collision	Wabash.....Moulton, Ia.....	" 1	
Collision	Seaboard Air Line & Central of Georgia.....Savannah, Ga.....	" 8	
Derailement	Missouri Pacific.....Gulpha, Ark.....	" 10	
Collision	Chicago & N. W.....Wis. Rapids, Wis.....	" 10	
Collision	Louisville & Nashville.....So. Leno, Ky.....	" 11	
Derailement	Western Maryland.....Mount Savage, Md.....	" 11	
Collision	Long Island.....Autumn Avenue.....	" 13	
Derailement	Texas & Pacific.....Maringouin, La.....	" 20	
Derailement	Missouri, K. & Texas.....Powers, Tex.....	" 22	
Derailement	Grand Trunk.....Ashley, Mich.....	" 23	
Automobile	Maryland Electric.....Shipley, Md.....	January 31	
Derailement	Toledo & Ohio Central.....New Lexington, O.....	February 25	
Collision	New York Central and Michigan Central.....Porter, Ind.....	" 27	
Collision	Pennsylvania.....Bailey, Pa.....	March 2	
Collision	Chicago & Alton and Illinois Traction.....Venice, Ill.....	" 9	
Collision	N. Y., N. H. & H.....Norwood Jr., Mass.....	" 17	
Collision	Chicago, B. & Q.....Red Cloud, Neb.....	" 20	

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, 163 Broadway, New York City. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—Fred W. Venton, 836 So. Michigan Ave., Chicago. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—S. W. Derr, Philadelphia & Reading, Philadelphia, Pa. Next meeting, July 12, Chicago.

AMERICAN ASSOCIATION OF ENGINEERS.—C. E. Drayer, 29 S. La Salle St., E. I. R. R., 332 South Michigan Ave., Chicago.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Annual meeting, November 21 and 22, Pinehurst, N. C.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next convention, August 24-26, 1921, Kansas City, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York. Next convention, October 3, Atlantic City. Exhibits this year will be omitted.

AMERICAN RAILROAD MASTER FITNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borchardt, 202 North Hamlin Ave., Chicago, Ill. Next convention September 12-14, Hotel Sherman, Chicago.

AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 75 Church St., New York, N. Y. Next regular meeting, November 16, 1921.

Division I—Operating.
Freight Station Section (including former activities of American Association of Freight Agents). R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.
Medical and Surgical Section. J. C. Caviston, 75 Church Street, New York.
Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association), J. C. Caviston, 75 Church St., New York, N. Y.
Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents). W. A. Fairbanks, 75 Church St., New York, N. Y.

Division II—Transportation (including former activities of the Association of Transportation and Car Accounting Officers). G. W. Covert, 431 South Dearborn St., Chicago, Ill.

Division III—Traffic. J. Gottschalk, 143 Liberty St., New York.

Division IV—Engineering. E. H. Fritch, 431 South Dearborn St., Chicago, Ill.

Construction and Maintenance Section. E. H. Fritch.
Electrical Section. E. H. Fritch.
Signal Section (including former activities of the Railway Signal Association) F. B. Wiegand (Chairman); H. S. Balliet, 75 Church St., New York, N. Y.

Division V—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Meeting postponed indefinitely.

Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.

Division VI—Purchases and Stores (including former activities of the Railway Storekeepers' Association). J. P. Murphy, General Storekeeper, New York Central, Collinwood, Ohio.

Division VII—Freight Claims (including former activities of the Freight Claim Association). Lewis Pilcher, 431 South Dearborn St., Chicago, Ill.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 Waller Ave., Austin Station, Chicago. Next convention, October 18-20, 1921, New York City. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—J. F. Jackson, Central of Georgia, Savannah, Ga. Next meeting, November, 1921, Chicago.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Next convention, which was to have been held August 9-11, Hotel Sherman, Chicago, has been postponed. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, Union Trust Bldg., Washington, D. C.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eiseman, 4600 Prospect Ave., Cleveland, Ohio. Next convention, September 19-24, Indianapolis, Ind.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—E. M. Chandler (acting secretary), 33 W. 39th St., New York. Regular meetings, 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, Northern Pacific Ry., Spokane, Wash.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—George M. Hunt, Chemist, Forest Products Laboratory, Madison, Wis.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, Northern Pacific R. R., St. Paul, Minn. Next annual meeting, May 19, 1922, Montreal.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Room 411, C. & N. W. Sta., Chicago. Next convention, October 18-21, Hotel La Salle, Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.

ASSOCIATION OF RAILWAY SUPPLY MEN.—A. W. Clokey, 1658 McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division 1.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division 2.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—A. J. Filkins, Paul Dickinson Company, Chicago. Meeting with convention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—W. A. Booth, 131 Charron St., Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—Thomas B. Koeneke, St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill. Convention this year has been postponed.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesian Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILWAY CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio.

EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division 7.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Next convention, which was to have been held August 16-18, 1921, Hotel Sherman, Chicago, has been postponed. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—George P. White, 747 Railway Exchange, Chicago. Meeting with International Railroad Master Blacksmiths' Association.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha Ave., Winona, Minn. Next convention, which was to have been held September 12-15, Hotel Sherman, Chicago, has been postponed. Exhibit by Association of Railway Supply Men.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Next convention, October 4-6, 1921, Buffalo, N. Y.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Division 5.)

MASTER CAR BUILDERS' ASSOCIATION.—(See A. R. A., Division 5.)

NATIONAL ASSOCIATION OF RAILROAD TIE PRODUCERS.—E. E. Pershall, T. J. Moss Tie Company, 720 Security Bldg., St. Louis, Mo.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, Peoples Gas Bldg., Chicago. Meeting with American Railway Engineering Association.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, at 29 W. 39th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting, 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Americus Club House, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—R. J. Himmelright, 17 East 42nd St., New York. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md. Annual meeting, October 18-20, Hotel Sherman, Chicago.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION.—(See A. R. A., Division 4, Signal Section.)

RAILWAY STOREKEEPERS' ASSOCIATION.—(See A. R. A., Division 6.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Exhibit at June convention of American Railway Association, has been cancelled.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next annual convention, September 20-22, 1921, Auditorium Hotel, Chicago. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meeting, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Sunbeam Electric Manufacturing Company, New York City. Meeting with American Railway Association, Signal Section.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—C. N. Thulin, 935 Peoples' Gas Bldg., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, 117 East 98th St., Cleveland, Ohio. Exhibit by Railway Equipment Manufacturers' Association.

WESTERN RAILWAY CLUB.—Bruce V. Crandall, 14 E. Jackson Boulevard, Chicago. Meeting third Monday each month except June, July and August.

Traffic News

The boats built by the Federal Government, for use on the New York State Barge Canal, have been sold to a New York and Chicago syndicate. These vessels have an aggregate capacity of 50,000 tons of freight, and are said to have cost the government \$3,695,000.

Tentative plans for a conference of the representatives of the railroads and the citrus fruit shippers of the Pacific Coast on the question of the reduction of transcontinental freight rates were announced at Washington by the "Producers and Shippers of Heavy Tonnage and Perishable Commodities from the Pacific Coast." The conference will be held July 1, according to present plans. The Interstate Commerce Commission has ordered the case of the California Citrus League against the railroads asking for lower rates on citrus fruits reopened. If the railroads and the shippers can come to an agreement a further hearing before the commission on the case will not be necessary. The shippers have objected to the latest increase of 33⅓ per cent on transcontinental rates on citrus fruit shipments and are asking that this increase be removed so that the old rate of \$1.44 on oranges and \$1.25 on lemons will prevail.

Conference with Shippers on Proposed Changes in Freight Rates

The "Fourth Section Committee of Southern Carriers" which for several months has been engaged in a general revision of class freight rates, following the amendment of the Fourth Section of the Interstate Commerce law by the Transportation Act of 1920, has invited boards of trade, prominent shippers and others to attend a conference in Atlanta, Ga., beginning on July 11, for the purpose of having a full and free discussion, and to see how well the proposed changes suit the shippers. This invitation is accompanied by statements showing the present and the proposed rates, so arranged that shippers can readily make comparisons. The changes have to do with rates to and from Ohio river crossings, Memphis, Nashville, Gulf ports, Mississippi river crossings, south Atlantic port and Virginian cities.

The chairman of the Fourth Section Committee is G. M. Goodwyn, Transportation building, Atlanta, Ga.

Southern Names Fast Freight Trains

The fast long-distance freight trains operated by the Southern Railway are now known by names, to enable shippers to identify them. There are 13 of them, as follows:

"Potomac Special."—New Orleans, Birmingham, Atlanta to Potomac Yards (near Washington, D. C.).

"Fruit Special."—Jacksonville, Columbia, Charlotte to Potomac Yards.

"Stock Special."—Chattanooga, Knoxville, Asheville to Potomac Yards.

"Long Leaf Special."—Selma, Anniston, Atlanta to Potomac Yards.

"Clyde Special."—Charleston, Columbia, Spartanburg to Atlanta and West.

"Wiregrass Special."—Atlanta, Macon to South Georgia and Florida points.

"Eastern Special."—Memphis, Chattanooga to Bristol and East over the Norfolk & Western through Hagerstown.

"Southwest Special."—From the East via Hagerstown, over the Norfolk & Western to Bristol; Southern Railway to Memphis.

"Florida-West Indian Special."—Cincinnati and Louisville to Jacksonville.

"Orange Special."—Jacksonville to Cincinnati and Louisville.

"Live Stock Special."—Birmingham to Cincinnati.

"Packing House Special."—Meridian to Atlanta.

"Petroleum Special."—Shreveport via "Vicksburg Route" to Meridian and Southern Railway to Atlanta.

Commission and Court News

Interstate Commerce Commission

Charges for Wharfage, Handling, Storage, Etc., at South Atlantic and Gulf Ports

The commission is in receipt of numerous inquiries as to whether or not it will give consideration to switching charges and free time allowances at the ports in connection with this proceeding. It has been concluded that the order instituting the investigation will be construed as including within its scope switching charges to and from the water terminals at the ports in question, and free time allowances on ocean traffic while in cars or in storage warehouses at the ports.

Personnel of Commissions

H. G. Butler, power administrator, and former assistant chief engineer, of the Railroad Commission of California, has resigned and will engage in private practice.

State Commissions

The legislature of the state of Illinois has passed the state administrations' bill, creating the "Illinois Commerce Commission" in place of the present State Utilities Commission. Although the main purpose of the bill was to provide "home" rule, it provides for appeal to the state body for final decision.

The Public Service Commission of Alabama has extended until October 31 the time within which the railroads of the state will be permitted to charge for freight on intrastate shipments 25 per cent more than the rates prescribed by the commission. This continuation was assented to by the traffic bureaus of Montgomery, Mobile and Birmingham. Another hearing will be held on October 3.

The New York State Public Service Commission, W. A. Prendergast, chairman, announces that the work of the commission will be conducted in four divisions—administrative, legal, engineering and accounting. Francis E. Roberts, former assistant secretary of the commission for the second district, has been appointed secretary of the commission, and John J. Hubbard, assistant secretary. The office of Mr. Roberts will be at Albany and that of Mr. Hubbard at New York City.

A hearing began before the State Railroad Commission of California on June 16 on the petition of the railways entering Los Angeles for a re-hearing of the decision handed down by the commission, ordering the railways to build a joint terminal in that city. It is expected that the railroads will contend that the commission has authority only over grade crossings and has no jurisdiction to require joint terminal facilities, which authority, they claim, is delegated to the Interstate Commerce Commission in the Transportation Act.

Court News

Decisions Under the Federal

Employers' Liability Act

Where cars were loaded and they began to move, destined for another state or country, the New York Appellate Division holds that a railroad employee assisting therein as freight yard conductor was engaged in interstate commerce, although he did not know that the cars were destined for another state or country and although the cars had not yet received their billing, the shipper having arranged directly with another railroad, to which the cars were being delivered, for the shipment and billing.—Cott v. Erie, 179 N. Y. Supp. 488.

The Court of Errors and Appeals of New Jersey holds, the Chancellor and Kalisch, J., dissenting, that a baggage-

room used in handling interstate business, is an instrumentality of interstate commerce, though it was also used for intrastate business and though, at the time of plaintiff's injury while painting it, it contained no interstate baggage.—*Culp v. Atlantic City* (N. J.), 110 Atl. 115.

The New York Appellate Division holds that a brakeman on an intrastate train, which, however, carried interstate freight, is engaged in interstate commerce when injured in attempting to load a barrel of oil for intrastate shipment.—*Evans v. U. S. R. A.* (New York Central), 191 App. Div. 704, 182 N. Y. S. 310.

The Circuit Court of Appeals, Second Circuit, holds that a railroad watchman on a pier used solely for interstate freight, who was injured while assisting in readjusting a door of the pier shed, to allow of delivery of freight to consignees, was engaged in interstate commerce.—*Delaware, L. & W. v. Busse*, 263 Fed. 516.

The Circuit Court of Appeals, Fifth Circuit, holds that a railroad employee, engaged in work on the ground unloading timber to be used by him and others in the reconstruction or repair of a bridge, part of a railroad used in interstate commerce, is within the act.—*Kansas City Southern v. Martin*, 262 Fed. 241.

The Arizona Supreme Court holds that an employee of an interstate railroad was engaged in interstate commerce when installing electric block signals along the main line to protect trains carrying both interstate and intrastate commerce.—*Saxton v. E. P. & S. W.* (Ariz.), 188 Pac. 257.

The New York Court of Appeals holds that a railroad shop employee, injured in falling against a saw while sawing timbers into pieces to be used for cross-ties, was not within the act, where it did not appear that the ties were prepared for any particular track, place, or work of repair.—*Buynofsky v. L. V.*, 228 N. Y. 249, 126 N. E. 714.

The Pennsylvania Supreme Court holds, while the question has not been directly decided by the United States Supreme Court, and the rulings thereon by other courts are not in harmony, that a crossing watchman while flagging an intrastate train is not employed in interstate commerce, although trains engaged in such commerce use the same track.—*Di Donato v. P. & R.*, 109 Atl. 627.

United States Supreme Court

Railroad May, After Merger, Sue for Transportation Balances Payable to Its Predecessor by Government

The Seaboard Air Line sued in the United States Court of Claims to recover balances for transportation services originally payable to the Florida Central & Peninsular, to whose rights it had succeeded through merger or consolidation. That court dismissed the petition, holding that because of Rev. Stat. 3477, declaring null and void transfers and assignments of claims upon the government, except after allowance and the issue of a warrant for payment thereof, the railroad could not maintain the action. The Supreme Court of the United States has reversed that judgment, holding that the case comes within the exceptions to the general language of the section which have been recognized in prior decisions as not within the evil at which the statute aimed, namely, frauds upon the Treasury. The court said in part: "We cannot believe that Congress intended to discourage, hinder or obstruct the orderly merger or consolidation of such corporations as the various States might authorize for the public interest. There is no probability that the United States could suffer injury in respect of outstanding claims from such union of interests and certainly the result would not be more deleterious than would follow their passing to heirs, devisees, assignees in bankruptcy, or receivers, all of which changes of ownership have been declared without the scope of the statute. The same principle which required the exceptions heretofore approved applies here."—*Seaboard Air Line v. United States*. Decided June 6, 1921. Opinion by Mr. Justice McReynolds.

Foreign Railway News

Krupps' Output

LONDON.

Recent visitors in Germany report that Krupps is working to capacity in its locomotive and car shops. Their output at present is 20 locomotives per month and it has recently completed its one thousandth freight car. This company is busy on locomotives for Russia and has a contract for tires for Russian locomotives. It is reported that the Prussian State Railways has a financial interest in the locomotive and car building division of the Krupp Works.

Mexico Receiving Locomotives

Francisco Guerra, inspector general of locomotives of the National Railways of Mexico, has just finished receiving the locomotives which the Mexican Government recently purchased from the Illinois Central Railroad. These locomotives entered Mexico at Matamoros and are being placed in regular service as rapidly as possible.

"Heretofore there has been serious congestion in the yards at Matamoros, Piedras Negras, Nuevo Laredo, Juarez, Monterey, Tampico and the City of Mexico," said Mr. Guerra. "The congestion was caused chiefly by the lack of locomotives to move the freight. However, since the railroads of the United States have come to the aid of the Mexican lines by leasing or selling them a large number of engines we are able to begin relieving the congestion.

"There are now only about one hundred cars on hand in the Matamoros yards and as five locomotives are available these will be dispatched in the next few days. With our lines operating more efficiently we expect a large volume of traffic will go through Brownsville for points on the east coast and also for the interior."

Another British Road in South America

Shows Improved Earnings

The Paraguay Central, a British road, operate 274 miles of line in Paraguay and is the only important road in that country. It runs southward from Asuncion to Encarnacion where it connects with lines in Argentina. On June 30, 1920, this road, according to Vice Consul Seltzer at Asuncion, had 24 locomotives, 46 passenger train cars and 470 freight cars. Its revenues are shown in the following table by fiscal years:

Year	Receipts	Expenses	Net
1913.....	\$712,043	\$391,590	\$320,453
1918.....	759,934	420,860	339,126
1919.....	1,108,624	639,246	469,378
1920.....	1,253,879	738,934	514,936
1920*.....	630,536	340,117	290,419

*Six months ending December 31, 1920.

This road handled 509,369 passengers in 1920, as against 418,635 in 1919. Freight tonnage in 1920 amounted to 223,228 and in 1919 to 194,090. Forest products make up some 40 per cent of the road's freight tonnage while other agricultural products make up the bulk of the remainder.

Railway Plans of the Argentine Government

LONDON.

The railway construction scheme decided upon by the Argentine government includes the completion of the State railways to La Quiaca on the Bolivian frontier in conjunction with the Bolivian government, the line from Rosario-de-Lerma in the Province of Salta to Huaytiquina on the Chilean frontier, a line from a station on the Central Northern State railway, near the city of San Juan, running due north to Jachal, passing through a portion of the Province of San Juan, and a railway extension in the Province of Buenos Aires to link up the Provincial Government line leading from San Nicolas, one of the ports on the Parana River to Neridiano Quinto.

This wide scheme is designed to compete more or less with

foreign railway interests, especially British, but it is believed that its completion will bring some economic advantage to the country and may perhaps advance the traffic of some of the foreign lines whose tracks are in the vicinity. There are, however, many difficulties standing in the way of the Argentine government which are unsurmountable at the present time, but it is anticipated that these difficulties will be partially or wholly overcome within a few years.

April Car Exports

Exports of freight cars showed further declines in April. The total was 572, valued at \$808,982. Six passenger cars were shipped, valued at \$42,298. The totals by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries.	Passenger		Freight and other		Farts of Cars
	Number		Number		
Finland					\$36
France					238
Greece					5,590
Italy					1,858
Sweden					366
England					1,872
Canada			66	\$86,798	32,482
Guatemala					1,372
Honduras					40,578
Panama					1,225
Salvador					75
Mexico	3	\$22,098	79	143,407	27,245
Newfoundland and Labrador					1,152
Jamaica					297
Trinidad and Tobago					7
Cuba			244	274,159	122,704
Virgin Islands of U. S.					1,587
Dominican Republic					16,729
Argentina					221,232
Brazil	3	20,200			299,591
Chile					28,563
Colombia					263
Ecuador					4,374
Peru			43	25,220	27,740
Venezuela			20	11,283	317
China					328,190
Kwantung, leased territory					1,906
Chosen					777
Dutch East Indies			61	64,251	
Japan			57	187,664	13,915
Australia			2	11,200	41,120
New Zealand					
Philippine Islands					3,415
Portuguese Africa					880
Total	6	\$42,298	572	\$808,982	\$1,227,696

April Track Material Exports

Exports of steel rails in April totaled 31,392 tons, valued at \$1,838,002. Shipments of spikes were valued at \$129,313 and of miscellaneous track material at \$544,209. The totals by countries, as compiled by the Bureau of Foreign and Domestic Commerce follow:

Countries.	Railroad Spikes. Pounds	Rails of Steel Tons	Switches, Frogs, Splice Bars, Etc.	
Netherlands		840	\$52,998	
Norway		54	3,265	\$200
Spain		1,854	119,953	7,044
England		1,870	185,719	2,824
Canada	91,883	\$4,315	487	27,649
Costa Rica	10,900	465		15
Guatemala	200	9		9
Honduras	33,000	1,228	111	4,878
Nicaragua	4,000	199		
Panama				650
Mexico	294,256	22,864	140	7,078
Trinidad & Tobago			5	281
Cuba	188,732	7,779	2,382	89,265
Dominican Republic	95,030	5,425		1,110
Argentina				460
Bolivia				474
Brazil	65,829	3,407	140	10,695
Chile	91,776	7,296	3,746	274,652
Colombia				1,419
Ecuador			26	1,437
British Guiana	2,000	95		
Peru	93,500	7,181	95	6,000
Venezuela	6,400	269	38	2,855
China	888,700	59,619	6,622	284,004
British India			45	2,202
Straits Settlements			644	41,860
Other British East Indies			16	1,297
Dutch East Indies			7,352	428,770
Hongkong	426	32	935	49,104
Japan	141,343	8,607	318	24,808
Siam			1,965	117,900
Australia			121	11,260
New Zealand			734	51,455
Philippine Islands			62	2,844
British South Africa			649	30,957
French Africa	1,300	65	16	762
Other British West Indies	8,531	458	125	4,742
Total	2,017,806	\$129,313	31,392	\$1,838,002

Extent of China's Railways

Hsu Shih-chang, president of China, in a recent book entitled "China After the War," discusses the railways of the country at some length. He calls attention to the mileage of the country, 7,000 miles operated as 24 lines. "Of this 2,600 miles are foreign-concession lines, namely, the Chinese Eastern, the South Manchuria, the Kiaochow-Tsinan, the Canton-Kowloon, the Yunnan Railway and the Lung-chen—while the Chinese Government lines number only 18, and extend over about 4,500 miles. This is certainly altogether insufficient. The United States with a territory of about the same size, and with only one-fourth of our population has 266,000 miles of railways, or 60 times as long as ours. Moreover many of our lines, though now nationalized were at first built with foreign capital. The diversity of foreign interests has made it impossible to lay out lines according to some comprehensive plan for the whole country.

"Such being the case, part of the capital seems to have been invested in unimportant routes, while many more important regions are without any modern means of communication. Ever since the first construction of railways in China 40 years ago, no less than \$400,000,000 has been expended. Yet trunk lines are found only north of the Yangtse River and East of the Honan Province, leaving the great plains to the South and West practically untraversed. In this way such portions of the country as Shensi, Kansu, Szechuan and Kweichow, are inaccessible to the coast, and their development is consequently retarded, industrially as well as commercially. Nor is this all, for in recent years railway loans made to China have often partaken of the nature of politico-commercial transactions. This not only hinders the proper industrial development of the country, but it also sows the seeds for future international complications. Therefore, in the interests of all concerned, such arrangements should be modified so as to preclude all undesirable possibilities."

Importance of Exports of American Locomotives

Exports of locomotives from this country in 1913 amounted to 491, valued at \$4,475,429. In 1919 the total was 959, valued at \$30,275,728. In 1920 the high mark of 1,711, valued at \$53,629,847, was reached. Over one-half of last year's exports (in value) went to European countries—primarily Italy, Poland, Belgium and France. Outside of Europe the most important buyers were Cuba, Brazil, China, South Africa and Argentina. The details by countries are given in the following table prepared by the Bureau of Foreign and Domestic Commerce:

Countries.	Number	Value
Azores and Madeira Islands	3	\$75,300
Belgium	155	8,764,188
Denmark	16	619,680
France	162	3,859,417
Italy	175	4,184,947
Poland and Danzig	139	6,548,050
Rumania	25	1,625,000
Spain	45	1,680,505
Sweden	1	18,992
Canada	78	786,108
Honduras	7	21,281
Nicaragua	1	7,400
Panama	5	8,541
Salvador	4	84,875
Mexico	65	866,054
Newfoundland and Labrador	2	39,735
Jamaica	7	191,010
Trinidad and Tobago	6	98,646
Other British West Indies	1	5,785
Cuba	288	8,369,082
Dutch West Indies	1	3,114
French West Indies	2	11,130
Dominican Republic	8	99,340
Argentina	33	1,131,070
Bolivia	1	21,410
Brazil	147	4,277,713
Chile	24	445,669
Colombia	18	417,081
Ecuador	1	98,025
British Guiana	13	22,700
Peru	2	199,291
Venezuela	2	24,465
China	86	3,370,510
Kwantung	11	478,435
Chosen	4	118,900
British India	15	363,921
Dutch East Indies	23	682,996
Japan	26	234,149
Australia	2	82,600
New Zealand	2	22,450
Philippine Islands	30	298,959
British West Africa	2	53,662
British South Africa	33	1,811,740
French Africa	10	368,000
Portuguese Africa	4	83,200
Egypt	25	1,054,721
Total	1,711	\$53,629,847

Equipment and Supplies

Locomotives

THE FERROCARRIL DE MONTEREY (Mexico) has ordered 4, 2-8-0 type locomotives from the American Locomotive Company.

THE SOUTH AFRICAN RAILWAYS are negotiating with the American Locomotive Company for the purchase of 78 locomotives.

THE PARIS-ORLEANS RAILWAY is negotiating with the American Locomotive Company for the purchase of electrical equipment.

THE SOVIET GOVERNMENT OF RUSSIA has placed orders for about 600 locomotives to be manufactured by the following companies: Nydquist & Holm, Inc., of Trollhattan, and Munkells Mekaniska Verkstads, Inc., of Eskilstuna, Sweden.

Freight Cars

THE NEW YORK CENTRAL is asking for prices on the repairs of 1,000 steel hopper or gondola cars of 50 tons' capacity.

THE MONTEREY STEEL COMPANY, Mexico, has ordered 50 all steel hopper cars, from the General American Car Company.

THE ILLINOIS CENTRAL has awarded a contract to the General American Car Company, for rebuilding 600 all steel gondola cars.

THE CHICAGO & ILLINOIS MIDLAND has given a contract to the General American Car Company for rebuilding 725 composite gondola cars.

THE MISSOURI PACIFIC, reported in the *Railway Age* of June 10 as inquiring for prices on the repair of 2,000 cars, will have repairs made to 500 wooden box cars by the Sheffield Car Company.

Iron and Steel

MITSUI & Co., New York, has ordered from the Consolidated Steel Corporation, 350 tons of 25-lb. rail and accessories, for export to Japan.

THE NEW YORK CENTRAL is asking for bids until 12 o'clock noon, July 6, for 100 gross tons of offset side incline type E, under-running third rail; also 1,500 pairs of angle bars.

Machinery and Tools

THE CHINESE GOVERNMENT RAILWAYS are inquiring through the New York export houses, for machine tools, to cost about \$200,000.

Track Specialties

THE NEW YORK CENTRAL will receive bids until 12 o'clock, noon, July 13, for a quantity of frogs and crossings, offset splices, stock and lock rails, center points, switches, repair parts for switch stands, switch tongues, switch box covers and repair parts for switches.

Miscellaneous

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, July 12, for bridge parts, steel and material for track scales and bridge repairs.

THE LORAIN STEEL COMPANY, Johnstown, Pa., recently made a shipment of about 1,500 tons of switch crossings and track accessories, to Buenos Aires, for use on the railroads in the Argentine Republic.

THE NEW YORK CENTRAL will receive bids until 12 o'clock, noon, July 14, for a minimum of 300,000 gal. and a maximum of 400,000 gal. of Asphaltum base fuel oil with gravity of 18-20 degree Baume, cold test 10 degree.

THE BOSTON & ALBANY will receive bids until 12 o'clock noon, July 12, at Boston, Mass., for 1 complete type E turntable center; 2 cast steel wheel bearings and caps for turntable wheels, one right and left, for 85 ft. turntable; 16 Bearings B, pattern M-452, and 1 complete type E turntable center with exception of saddle casting.

THE ATCHISON, TOPEKA & SANTA FE has placed an order with the Babcock & Wilcox Company, New York, for boilers to be installed in its proposed power plant at Albuquerque, N. M. The company has also ordered engines to be installed in connection with the same project from the Skinner Company, Erie, Pa.

Signaling

THE MISSOURI, KANSAS & TEXAS has placed an order with the Union Switch & Signal Co., Swissvale, Pa., for 55 style "S" one-arm three-position semaphore signals and necessary apparatus for installation between Labette, Okla., and Vinita. All work will be carried out by railroad company forces.

Trade Publications

VISCOSIMETER CONVERSION CHARTS.—The May, 1921, issue of *Lubrication*, published by the Texas Company, contains a chart for converting viscosimeter readings from one standard to another. By means of the diagram, the time or degrees can be read directly for the Saybolt, Engler, Redwood Admiralty, Saybolt Furol, or Barbey instruments.

HOISTING EQUIPMENT.—The Dake Engine Company, Grand Haven, Mich., has recently issued a new catalogue of its complete line of air and steam motor hoisting equipment, steam boilers, etc. This catalogue comprises 72 pages, attractively arranged and bound. The catalogue is devoted chiefly to the describing and illustrating of the Dake steam or air operated motor as an integral part of various hoisting equipment, blower fans and centrifugal pumps.

POWER PLANT PIPING.—Valuable data concerning the design, manufacture and installation of complete power plant piping systems are contained in a 130-page, illustrated book recently issued by the M. W. Kellogg Company, New York. Information on the bending and welding of pipe, valves and fittings is presented in a thorough and interesting manner, as well as considerable tabulated matter on the properties of saturated steam, flow of steam and water in pipes, loss of head in pipe by friction, circumferences and areas of circles, etc. Several conversion tables are included.

THE ILLINOIS CENTRAL made a record for passenger train performance during the month of May, when a total of 13,567 trains were operated, 13,461, or 92.2 per cent, of which maintained scheduled time.

EIGHTY-ONE PER CENT REDUCTION in the number of casualties per 1,000 man-hours worked, was the result of a recent 60-day prevention-of-accident campaign conducted on the Baltimore & Ohio by John T. Broderick, Superintendent of Safety, among employees at the principal terminals and shops. The East Side Terminal at Philadelphia, Pa., and the Toledo Terminal, Toledo, Ohio, were the winners of the banners offered by Vice-president C. W. Galloway. The boiler shop at Mount Clare and the maintenance of equipment department at New York won local banners. During the "drive" a record was kept of all bodily injuries and after each accident there was an investigation. The ratio of casualties to man-hours worked this year, as compared with last year during the same period, was the basis on which the winners were determined. On the whole system there was an increase of 231 per cent in man-hours worked per casualty.

Supply Trade News

R. H. Blackall, Farmers Bank building, Pittsburgh, Pa., will act as railway representative for Pittsburgh and vicinity, for the **Lowe Brothers Company**, Dayton, Ohio.

The agency for time and motion study watches and other "instruments of precision," formerly held by **M. J. Silberberg**, Chicago, has been taken over by **Stein & Ellbogen Company**, 31 N. State street, Chicago.

De Forest Lillis, who has been appointed western representative of the **Dressel Manufacturing Corporation**, New York, successor to the **Dressel Railway Lamp Works**, as was



De Forest Lillis

noted in the *Railway Age* of June 3, has opened an office in the Railway Exchange building, Chicago. Mr. Lillis has had several years' experience as salesman of railway supplies, and has acted as eastern representative of various western railway supply manufacturers in New York. Before entering the supply field, he was in railroad service on the New York Central, his last assignment being that of chief clerk to the general superintendent of motive power.

P. L. Laughlin, assistant district sales manager of the **Verona Tool Works** at Chicago, has been promoted to district sales manager, succeeding **John B. Seymour**, whose appointment as sales manager of the **Superior Supply Company**, Chicago, was announced in the *Railway Age* of June 17 (page 1422).

H. A. Paarman, assistant to secretary of the **Burden Iron Company**, Railroad & Steamship division, 3711 Grand Central Terminal, New York City, has been appointed secretary to succeed **W. J. Caton**, whose death was noted in our issue of June 24. Mr. Paarman will also continue to serve in the sales department of the **Sanitation & Supply Company**, New York City.

C. J. Burkholder and **Frank H. Cunningham** have been appointed special engineers of the **Franklin Railway Supply Company, Inc.**, New York. Mr. Burkholder began railroad work at Tyrone, Pa., and subsequently served first as locomotive fireman and then as locomotive engineer on the Union Pacific. He then went with the **Kansas City Southern**, as locomotive engineer, later serving consecutively as traveling engineer, trainmaster, general road foreman of engines and division superintendent. He then became mechanical representative of the **Economy Devices Corporation**, which later merged into the **Franklin Railway Supply Company, Inc.** In November, 1918, he resigned from the position of western sales manager of the **Franklin Railway Supply Company** to become master mechanic of the **Kansas City Southern**, which position he held until his appointment as above noted. Mr. Cunningham was born in Roanoke, Va., on May 23, 1886. After serving an apprenticeship as machinist on the **Norfolk & Western**, he attended the University of Virginia. Following his graduation with the degree of mechanical engineer, he returned to the **Norfolk & Western** as machinist, subsequently becoming material inspector, mechanical inspector, assistant engineer of tests and supervisor of locomotive

stokers. In 1914, he went with the **Standard Stoker Company** as fuel engineer, being appointed later to plant manager at Erie, Pa., and assistant general manager, from which position he now resigned to enter the services of the **Franklin Railway Supply Company, Inc.**, as above noted.

Obituary

Alvin T. Hert, president of the **American Creosoting Company**, Louisville, Ky., and affiliated companies, died on June 7.

Will H. Bloss, manager steam railroad sales, of the **Ohio Brass Company**, Mansfield, Ohio, died suddenly from heart failure at his home in Mansfield on June 22. Mr. Bloss was born on April 4, 1869, and received his engineering training at the **Indiana University**. He started his career in railroad work and subsequently was division engineer on the **Santa Fe**. He later served as chief engineer of the **Indiana Union Traction Company**. In 1906 he went to the **Ohio Brass Company** from the **Buda Company** of Chicago and was district sales manager in some of the central states until about a year ago. From that time he had devoted his effort to electrification development and other steam railroad problems.

E. E. Hudson, who was elected president of the **Waterbury Battery Company**, Waterbury, Conn., in March, 1921, died on June 27, at his home in **Maplewood**, N. J. Mr.



E. E. Hudson

Hudson for the past 22 years, with the exception of a little over a year's time, had been in the sales and managerial departments of concerns manufacturing primary batteries and had been identified with the installation of the primary battery. In July, 1898, he served as chief clerk in the primary battery sales department of the **Edison Manufacturing Company**, remaining in that position until June, 1902. Shortly afterward, he served as an accountant in the controller's department of the **United States Steel**

Company. In December, 1903, he became secretary and treasurer of the **Battery Supplies Company**, Newark, N. J., and in 1905 was appointed sales manager of that company. When the **Edison company** absorbed the **Battery Supplies Company**, in 1908, he was appointed assistant manager of sales in the primary battery department. He became sales manager of that department in February, 1909, and in September, 1913, was elected also vice-president. In October, 1914, in addition to these duties, he was given charge of the manufacturing, as well as the sales, and in March, 1915, was made division manager in general charge of the entire primary battery business of **Thomas A. Edison, Inc.** In 1914 he was chairman of the **Railway Telephone & Telegraph Appliance Association**, and in 1916 he was chairman of the **Signal Appliance Association**, previously having been a director. On January 1, 1917, he was elected vice-president and general manager of the **Waterbury Battery Company** and since March of this year was president of the same company as above noted.

THE OFFICERS of the **Reid-Newfoundland Railway** say that all business will have to be suspended at once if the government does not come to their relief. During the war the railroad was taken over by the government. Recently it was returned to its owners, who declare that expenses now so greatly exceed income that it is impossible to continue operation without government aid.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company, which was noted in the *Railway Age* of June 24 (page 1470), as about to accept bids for the installation of a new 120 ft. turntable at Winslow, Ariz., is carrying out this project with company forces.

CHICAGO, BURLINGTON & QUINCY.—This company is planning an addition to its yards at Centralia, Ill.

CHICAGO, BURLINGTON & QUINCY.—This company has resumed work, with company forces, on the street subway structures in connection with the track elevation project at Aurora, Ill.

CHICAGO, BURLINGTON & QUINCY.—This company has awarded a contract to G. A. Johnson & Co., Chicago, for the construction of an addition to its railway mail terminal at Omaha, Neb. The company is also accepting bids for the construction of a new grain elevator at St. Joseph, Mo.

CHICAGO GREAT WESTERN.—This company has awarded a contract to Charles Weitz, Des Moines, Iowa, for the construction of a frame freight station with dimensions of 40 ft. by 480 ft., at Des Moines, to cost about \$40,000.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—This company contemplates the construction of a new freight station at French Lick, Ind.

CHICAGO UNION STATION.—This company will shortly accept bids for wrecking the old Chicago & Alton freight house south of Van Buren street, Chicago. The company will also accept bids shortly for grading the new station site between Madison and Adams streets, and for laying a 12-duct conduit line between Harrison and Van Buren streets.

GREAT NORTHERN.—This company is installing, with company forces, a new low voltage power interlocking plant at Bridge A-8, near Saunders, Wis. The new low voltage layout will be controlled from the Saunders interlocking plant, located about one mile away, and will replace the present manual interlocking plant at the bridge.

ILLINOIS CENTRAL.—This company is accepting bids for the construction of two water-treating plants, one at La Salle, Ill., and the other at Assumption, Ill.

ILLINOIS CENTRAL.—This company, which contemplated the construction of a new pumping station at Amboy, Ill., with company forces, has decided to award a contract for this work and is accepting bids.

ILLINOIS CENTRAL.—This company has awarded a contract to the Railway Water & Coal Handling Company, Chicago, for water piping and sewer work in connection with the construction of additions and improvements to its roundhouse at Dubuque, Iowa.

INTERNATIONAL & GREAT NORTHERN.—This company is accepting bids for the construction of a new hospital building at Palestine, Tex., to cost about \$100,000.

LOUISVILLE & NASHVILLE.—This company has awarded a contract to Rommel Brothers, Louisville, Ky., for the construction of a brick and steel power plant at Paris, Tenn.

LOUISIANA RAILWAY & NAVIGATION.—This company contemplates the construction of a new passenger station at Girod and Rampart streets, New Orleans, La., on a site purchased by the road some time ago.

MISSOURI, KANSAS & TEXAS.—This company contemplates the enlargement of its terminal at Denison, Tex., including the construction of a new roundhouse, to be used for road locomotives, releasing the present roundhouse for switch engines. The company also plans to enlarge its yard, roundhouse and freight house at Fort Worth; improve its roundhouse facilities at Waco; add to its yards and roundhouse at Smithville; install additional roundhouse facilities at Houston, and add to its freight house at Wichita Falls.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—*Asks Authority to Abandon Branch.*—This company has applied to the Interstate Commerce Commission for a certificate authorizing it to abandon its Burnett branch in Kay County, Okla., a distance of 4.67 miles.

ATLANTA, BIRMINGHAM & ATLANTIC.—*Special Master Appointed.*—Albert G. Foster, of Madison, Ga., has been appointed special master in the receivership of this road.

BENNETTSVILLE & CHERAW.—*Asks Authority to Abandon Line.*—This company has applied to the Interstate Commerce Commission for a certificate authorizing the abandonment of 10½ miles of track between Brownsville and Sellers, S. C.

BOSTON & MAINE.—*Application for a Loan.*—This company has applied to the Interstate Commerce Commission for a loan of \$3,049,000 for 15 years to enable it to pay the obligation of subsidiary companies about to fall due.

CHICAGO, MILWAUKEE & ST. PAUL.—*Acquisition of C. T. H. & S. Approved.*—See Chicago, Terre Haute & Southeastern.

CHICAGO, ROCK ISLAND & PACIFIC.—*Loan for Equipment Approved.*—The Interstate Commerce Commission has approved a loan to this company of \$1,568,540 for equipment to be purchased through the National Railway Service Corporation, including 15 Santa Fe locomotives at a cost of \$78,673 each, 10 Mikado locomotives at \$66,705, 10 mountain type locomotives at \$70,103, 50 cabooses at \$4,463 and 500 50-ton gondolas at \$2,300. The Rock Island had originally asked for a loan of \$17,866,503. Commissioner Daniels wrote a dissenting opinion in which he said the fundamental inherent weakness of the leasing basis of financing proposed is its failure to make allowance for possible, not to say probable, fall in the price of equipment during the early years of the trust duration. Should even a moderate fall in price occur, he said, the value of the assets would become materially short of the certificates outstanding.

CHICAGO, TERRE HAUTE & SOUTHEASTERN.—*Acquisition by C. M. & St. P. Approved.*—The Interstate Commerce Commission has approved and authorized the acquisition by the Chicago, Milwaukee & St. Paul of control of this company by lease and by the purchase of its capital stock. Authority was also granted to the Chicago, Milwaukee & St. Paul to assume as liability in respect of the payment of the principal and interest of equipment bonds, promissory notes, and mortgage bonds of the Chicago, Terre Haute & Southeastern and bonds of the Bedford Belt and the Southern Indiana. That part of the application requesting a certificate of public convenience and necessity for the abandonment by the Chicago, Terre Haute & Southeastern of the operation of its line was dismissed as unnecessary.

CUBA RAILROAD.—*New Director.*—William H. Woodin, president of the American Car & Foundry Company, has been elected a director, thereby increasing the board from ten to eleven members.

DELTA SOUTHERN.—*Asks Authority to Abandon Line.*—This company has applied to the Interstate Commerce Commission for a certificate authorizing it to abandon its line of 52 miles in Mississippi.

FLINT BELT.—*Asks Authority to Issue Capital Stock.*—This company has applied to the Interstate Commerce Commission for authority to issue \$1,000,000 of capital stock, the proceeds to be used in the construction of its railroad. The stock is to be acquired by the Pere Marquette.

GREENE COUNTY.—*Loan Approved.*—The Interstate Commerce Commission has approved a loan of \$60,000 to this company to assist it in meeting maturing indebtedness.

ILLINOIS CENTRAL.—*Bond Issue.*—Kuhn, Loeb & Co. have sold an issue of \$8,000,000 fifteen-year 6½ per cent secured gold bonds. The issue was formally offered for public subscription on Mon-

(Continued on page 49)

Annual Report

Southern Pacific Company—Thirty-seventh Annual Report

New York, N. Y., June 23, 1921.

TO THE STOCKHOLDERS OF THE SOUTHERN PACIFIC COMPANY:

Your Board of Directors submits this report of the operations and affairs of the Southern Pacific Company and of its Proprietary Companies for the fiscal year ended December 31, 1920.

As stated in last year's report, the Federal Government, which took over the railroads and steamship lines of your company on December 28, 1917, relinquished control of such properties at 12:01 A.M., March 1, 1920. Your properties, therefore, were operated by the Director General of Railroads during the first two months of the year, and by your company during the last ten months of the year. In the following table showing the net railway operating income of the Southern Pacific Transportation System for the year 1920, compared with that for the year 1919, the figures for 1920 include the results from the operation of your properties for the entire year, regardless of the change in the form of control. To make the figures for 1919 comparable, they have been revised to include, in addition to Federal operations, \$1,457,689.84, corporate operating expenses, and \$2,433,617.90, war taxes, which, in the report for last year, were included in the deductions from Corporate income.

	Calendar Year 1920	Calendar Year 1919	+ Increase — Decrease	Per Cent
1. Average miles of road operated.	11,151.60	11,043.11	+ 108.49	.98
RAILWAY OPERATING REVENUES				
2. Freight	\$183,416,522.60	\$163,011,660.07	+\$20,404,862.53	12.52
3. Passenger	71,701,637.26	59,371,140.37	+ 12,330,496.89	20.77
4. Mail and express	13,660,156.92	7,838,257.82	+ 5,821,899.10	74.28
5. All other transportation	5,074,092.84	2,446,116.63	+ 2,627,976.21	107.43
6. Incidental	8,342,712.13	6,886,516.60	+ 1,456,195.53	21.15
7. Joint facility—Credit	105,349.51	128,988.99	— 23,639.48	18.33
8. Joint facility—Debit	30,967.01	25,408.13	— 5,538.88	21.88
9. Total railway operating revenues	\$282,269,504.25	\$239,657,272.35	+\$42,612,231.90	17.78
RAILWAY OPERATING EXPENSES				
10. Maintenance of way and structures	\$48,465,465.26	\$34,894,157.31	+\$13,571,307.95	38.89
11. Maintenance of equipment	59,548,392.36	48,011,453.31	+ 11,536,939.05	24.03
12. Total maintenance	\$108,013,857.62	\$82,905,610.62	+\$25,108,247.00	30.29
13. Traffic	3,499,705.53	2,256,660.61	+ 1,234,044.92	54.68
14. Transportation	117,227,797.91	93,280,330.78	+ 23,947,467.13	25.67
15. Miscellaneous operations	5,609,062.74	4,231,266.21	+ 1,377,796.53	32.56
16. General	8,112,651.83	6,101,739.76	+ 2,010,912.07	32.96
17. Transportation for investment—Credit	340,286.57	390,435.63	— 50,149.06	12.84
18. Total railway operating expenses	\$242,113,790.06	\$188,385,172.35	+\$53,728,617.71	28.52
19. Net revenue from railway operations	\$40,155,714.19	\$51,272,100.00	—\$11,116,385.81	21.68
20. Railway tax accruals	\$14,792,063.67	\$11,911,994.62	+ \$2,880,069.05	24.18
21. Uncollectible railway revenues	112,945.09	51,694.91	+ 61,250.18	118.48
22. Railway operating income	\$25,250,705.43	\$39,308,410.47	—\$14,057,705.04	35.76
23. Equipment rents—Net	4,496,775.66	*378,081.20	+ 4,874,856.86	—
24. Joint facility rents—Net	*558,414.27	9,423.90	+ *567,838.17	—
25. Net railway operating income	\$21,312,344.04	\$39,677,067.77	—\$18,364,723.73	46.28

*Credit.

FEDERAL OPERATIONS

The Director General of Railroads operated your properties during the months of January and February, 1920. The net income for those months amounted to \$4,869,574.25.

The following table shows the results of Federal operations during the whole period of Federal control—January 1, 1918, to February 29, 1920—compared with the standard return compensation payable by the United States Government for the use of your properties:

	Federal Income in excess of Standard Return	Standard Return in excess of Federal Income
1918	\$7,757,935.04	
1919	—	\$4,334,355.44
January and February, 1920	—	3,173,713.78
*Federal Income in excess of Standard Return entire period of Federal control	\$249,865.82	

*This result may be changed when the accounts between the Director General of Railroads and the various corporations are finally settled.

	1920	1919	1918	1917
Operating revenues	\$282,269,504.25	\$239,657,272.35	\$221,611,206.21	\$193,971,489.54
Operating expenses	242,113,790.06	188,385,172.35	162,722,371.84	120,601,822.82
Net revenue from railway operations	40,155,714.19	51,272,100.00	58,888,834.37	73,369,666.72
Operating ratio, per cent	85.77	78.61	73.43	62.18
Total train miles	51,890,806	46,865,209	49,701,205	54,024,759
Traffic units (ton miles plus 3 times passenger miles)	22,010,457,900	20,198,015,285	20,836,032,669	20,876,908,397

The status of the accounts of your Company and its Proprietary Companies at December 31, 1920, with the United States Railroad Administration, incident to the period of Federal operations, is shown in the balance sheet. The net balance of \$1,695,262.66 due from the Government, as shown by such accounts, is made up as follows:

Due from Government on account of depreciation reserves, and road and equipment retirements	\$10,879,165.36
Less:	
Amounts advanced by Government for additions and betterments; expenses prior to January 1, 1918, and other corporate liabilities, in excess of cash, agents' and conductors' balances; revenues prior to January 1, 1918; balance due on standard return; and other corporate assets collected	\$8,217,508.62
Agents' and conductors' balances at February 29, 1920	594,037.01
Book value of materials and supplies turned over by Director General on February 29, 1920, in excess of the book value of materials and supplies taken over by him on January 1, 1918 (subject to adjustment as noted below)	372,357.07
Balance due from Government	\$1,695,262.66

Under the contract with the Director General he is required to return to the companies at the end of Federal control, materials and supplies equal in quantity, quality and relative usefulness to the materials and supplies which he received, or to pay for any deficiency at prices prevailing at the end of Federal control. Pending final settlements of the accounts, the book value of the materials and supplies, returned by the Director General on March 1, 1920, has been temporarily credited to the Government accounts. Owing to the high prices prevailing during, and at the end of, Federal control, the value of the materials and supplies returned by the Director General was considerably in excess of the value of the materials and supplies taken over by him; but as the quantity returned was less as a whole, there will be a considerable amount due from the Government on account of materials and supplies, instead of an amount due to the Government, as indicated by the foregoing statement.

GUARANTY PERIOD OPERATIONS

As stated in last year's report, your company accepted, for itself and all its system lines, the guaranty offered by the Government under the terms of the Transportation Act of 1920, to the effect that the railway operating income for the six months' period beginning March 1, 1920, should not be less than one-half of the annual compensation fixed in the contract made with the Director General of Railroads under the Federal Control Act, including additional compensation for use of additions and betterments.

One of the provisions of such guaranty was, that there should not be included in operating expenses for maintenance of way and structures, or for maintenance of equipment, during the guaranty period, more than an amount fixed by the Interstate Commerce Commission. The Commission has not yet fixed the amount of such maintenance expenditures to be included in operating expenses, and in determining the results of operation and the amount due from the Government for the guaranty period as shown below, there have been included in maintenance expenses only the actual expenditures for maintenance during the guaranty period, and the known unaudited expenses attributable to such period.

AMOUNT DUE FROM U. S. GOVERNMENT UNDER ITS GUARANTY

Amount of Government's guaranty for the six months' period from March 1 to August 31, 1920, being one-half of the annual compensation fixed in the contract of February 19, 1919, with the Director General, as changed by the Interstate Commerce Commission up to December 31, 1920

Net railway operating income for the above period as booked to December 31, 1920	\$23,979,110.92
Estimated balance due from the Government, as determined above, taken into the year's income account	3,488,683.42
	\$20,490,427.50

The amount of the Government's guaranty, as shown above, does not include any additional compensation for the use of additions and betterments, new equipment, and road extensions, as complete data for computing such additional compensation were not available at the time the income account for the year was closed.

Under the Transportation Act the Interstate Commerce Commission is required, as soon as practicable after the expiration of the guaranty period, to ascertain and certify to the Secretary of the Treasury the amount necessary to make good the guaranty to each carrier, and on October 18, 1920, the Commission issued an order requiring each carrier which had accepted the guaranty offered by the Government to file a statement showing the amount due to the company by the Government under the latter's guaranty as computed by the company. In its order the Commission stated it had adopted no formula for computing the maintenance allowance for the guaranty period, and suggested that each carrier should prepare and submit for the consideration of the Commission such data in connection with the maintenance adjustments proposed by the carrier as the latter should consider proper. Since the close of the year your company has prepared and filed its claim in accordance with such order, and it is hoped that an early settlement will be obtained.

Following is a summary of operating revenues, operating expenses and net revenue from railway operations, also traffic volume, showing the results of transportation operations for 1920 compared with 1919 and 1918 under Federal control, and with 1917, the last year of private operation prior to Government control:

The above table illustrates the constant and enormous growth of operating expenses since 1917, which is the result of changed conditions commencing with Federal control, the net revenue of 1920 being 45.2% less than 1917 despite movement of 5.4% more traffic units with 3.9% less train miles. Average railway wages were increased by governmental agencies, either during or subsequent to Federal control, to a figure 92% above the average for 1917. The expense of operating your property has been profoundly affected by this cause and by increases in prices of fuel, ties, lumber and all other kinds of material used in operation. The net revenues of 1920 were further decreased through the failure to advance freight and passenger rates to cover added prices until the end of August, whereas the large wage award made by the United States Railroad Labor Board was retroactive from May 1, 1920. Expenses of 1920 were augmented through

various agreements of a national character executed by the Director General late in 1919 establishing working rules under which compensation is allowed in excess of the value of services performed, and time and one-half punitive overtime is paid after 8 hours in various classes of service, including operation of freight trains where delay to such trains is rewarded by premium payments for overtime.

Since the return of your lines on March 1, 1920, the initiative of your organization has resumed effect, normal service has been restored, unfair rate relationships have been corrected and progress has been made in recovering diverted traffic.

Comparing 1920 with 1919, ton miles of revenue freight increased 8.53%; revenue passengers carried one mile increased 7%, augmented by increased tourist travel and large conventions on the Pacific Coast, and operating

INCOME ACCOUNT
SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES, COMBINED
(Excluding offsetting accounts)

	Year Ended December 31, 1920	Year Ended December 31, 1919	+Increase —Decrease	Per Cent
OPERATING INCOME (March 1 to December 31, 1920, inclusive)				
RAILWAY OPERATING REVENUES:				
1. Freight	\$157,220,043.42		+\$157,220,043.42	
2. Passenger	61,607,126.86		+ 61,607,126.86	
3. Main	3,764,550.44	See	+ 3,764,550.44	
4. Express	6,054,466.52	Explanation	+ 6,054,466.52	
5. All other transportation	4,639,538.20		+ 4,639,538.20	
6. Incidental	7,038,752.12		+ 7,038,752.12	
7. Joint facility—Credit	81,889.56	Below	+ 81,889.56	
8. Joint facility—Debit	24,874.94		+ 24,874.94	
9. Railway operating revenues	\$240,381,492.18		+\$240,381,492.18	
RAILWAY OPERATING EXPENSES:				
10. Maintenance of way and structures	\$41,938,579.91	\$94,614.60	+ \$41,843,965.31	
11. Maintenance of equipment	49,921,811.29	42,079.56	+ 49,879,731.73	
12. Total maintenance	\$91,860,391.20	\$136,694.16	+\$91,723,697.04	
13. Traffic	3,097,893.12	94,474.15	+ 3,003,418.97	
14. Transportation	100,486,655.12	5,664.15	+ 100,480,990.97	
15. Miscellaneous operations	4,830,833.96	—	+ 4,830,833.96	
16. General	7,247,152.52	1,220,857.38	+ 6,026,295.14	
17. Transportation for investment—Credit	336,066.68	—	+ 336,066.68	
18. Railway operating expenses	\$207,186,859.24	(a) \$1,457,689.84	+\$205,729,169.40	
19. Net revenue from railway operations	\$33,194,632.94	(b) \$1,457,689.84	+ \$34,652,322.78	
20. RAILWAY TAX ACCRUALS	13,006,696.07	(a) 2,433,617.90	+ 10,573,078.17	
21. UNCOLLECTIBLE RAILWAY REVENUES	95,346.40	—	+ 95,346.40	
22. Equipment rents—Net	4,060,345.12	—	+ 4,060,345.12	
23. Joint facility rents—Net	(c) 492,695.98	—	+ (c) 492,695.98	
24. Net railway operating income	\$16,524,941.33	(b) \$3,891,307.74	+ \$20,416,249.07	
25. REVENUES FROM MISCELLANEOUS OPERATIONS	\$2,581,763.93	\$14,033,155.75	— \$11,451,391.82	81.60
26. EXPENSES OF MISCELLANEOUS OPERATIONS	1,342,255.38	7,565,331.96	— 6,223,076.58	82.26
27. Net revenues from miscellaneous operations	\$1,239,508.55	\$6,467,823.79	— \$5,228,315.24	80.84
28. TAXES ON MISCELLANEOUS OPERATING PROPERTY	46,346.16	223,706.58	— 177,360.42	79.28
29. Miscellaneous operating income	\$1,193,162.39	\$6,244,117.21	— \$5,050,954.82	80.89
30. Total operating income	\$17,718,103.72	\$2,352,809.47	+\$15,365,294.25	
NONOPERATING INCOME				
31. Income from lease of road—Standard return	(d) \$8,043,288.03	\$48,244,660.03	— \$40,201,372.00	83.33
32. Other income from lease of road	34,705.27	28,497.04	+ 6,208.23	21.79
33. Miscellaneous rent income	809,388.70	731,015.97	+ 78,372.73	10.72
34. Miscellaneous nonoperating physical property	373,830.41	360,069.30	+ 13,761.11	3.82
35. Separately operated properties—Profit	31,269.12	24,909.46	+ 6,359.66	25.53
36. Dividend income	5,251,323.94	1,182,038.97	+ 4,069,284.97	344.26
37. Income from funded securities—bonds and notes—affiliated and other companies	1,921,964.07	2,370,301.11	— 448,337.04	18.91
38. Income from funded securities—investment advances—affiliated companies	389,226.77	443,942.36	— 54,715.59	12.32
39. Income from unfunded securities and accounts	1,370,528.34	355,563.95	+ 1,014,964.39	285.45
40. Income from sinking and other reserve funds	774,710.08	72,040.20	+ 702,669.88	4.40
41. Miscellaneous income—U. S. Government guaranty	(e) 20,490,427.50	—	+ 20,490,427.50	
42. Other miscellaneous income	(f) 401,949.71	622,172.08	— 220,222.37	35.40
43. Total nonoperating income	\$39,892,611.94	\$55,105,210.47	— \$15,212,598.53	27.61
44. Gross income	\$57,610,715.66	\$57,458,019.94	+ \$152,695.72	.27
DEDUCTIONS FROM GROSS INCOME				
45. Rent for leased roads	\$226,277.70	\$267,019.89	— \$40,742.19	15.26
46. Miscellaneous rents	600,925.75	717,692.48	— 116,766.73	16.27
47. Miscellaneous tax accruals	838,367.78	706,591.76	+ 131,776.02	18.65
48. Interest on funded debt—bonds and notes	22,533,488.13	22,701,121.06	— 167,632.93	.74
49. Interest on funded debt—nonnegotiable debt to affiliated companies	136,478.00	147,496.30	— 11,018.30	7.47
50. Interest on unfunded debt	51,303.51	375,066.92	— 323,763.41	86.32
51. Amortization of discount on funded debt	169,228.14	292,131.27	— 122,903.13	42.07
52. Maintenance of investment organization	24,789.93	32,154.99	— 7,365.06	22.90
53. Other miscellaneous income charges	(g) 959,582.09	670,138.21	+ 289,443.88	43.19
54. Total deductions from gross income	\$25,540,441.03	\$25,909,412.88	— \$368,971.85	1.42
55. Net income	\$32,070,274.63	\$31,548,607.06	+ \$521,667.57	1.65
DISPOSITION OF NET INCOME				
56. Income applied to sinking and other reserve funds	\$1,053,945.19	\$1,022,863.92	+ \$31,081.27	3.04
57. Dividend appropriations of income	—	(h) 17,478,459.12	— 17,478,459.12	—
58. Total appropriations	\$1,053,945.19	\$18,501,323.04	— \$17,447,377.85	94.30
59. Income balance transferred to credit of profit and loss	\$31,016,329.44	\$13,047,284.02	+ \$17,969,045.42	137.72
60. Per cent of net income on average amount of outstanding capital stock of Southern Pacific Company	10.57	10.45	+ .12	1.15

(a) The \$1,457,689.84 of operating expenses for 1919 (lines 10 to 18) together with the \$32,154.99 of Maintenance of investment organization (line 52) make up the corporate operating expenses reported last year; and the \$2,433,617.90 of Railway tax accruals for 1919 (line 20) are the war taxes reported last year. These figures are reported this year against lines 10 to 20 for comparative purposes. (b) Loss. (c) Credit. (d) Represents the proportion for January and February, 1920, of annual compensation payable by United States Government for use of Southern Pacific Transportation System, as fixed in the agreement with the Director General of Railroads. (e) Represents the approximate amount due from United States Government, under its guaranty, for six months ended August 31, 1920. (f) This year's figures include \$121,432.25 and last year's figures \$414,834.36 representing revenues prior to January 1, 1918. (g) This year's figures include \$702,739.05 and last year's figures \$337,856.85 representing expenses prior to January 1, 1918. (h) Includes \$334.00 representing dividends on stocks of Proprietary Companies held by the Public.

revenue increased \$42,612,232 or 18%. These results were adversely affected by a protracted strike of longshoremen of coastwise steamship lines extending from March until August (in which the demands of the strikers were successfully resisted) and an increasing diversion of trans-continental tonnage to the Panama Canal during the latter part of the year. On the other hand, increased freight and passenger rates were authorized by the Interstate Commerce Commission to become effective August 26, 1920, the benefits of which accrued during the last four months of the year except that some of the states denied corresponding increases on intrastate traffic which (upon appeal to the Interstate Commerce Commission) with unimportant exceptions, have been more recently authorized.

The increase of \$53,728,617.71, or 28.52%, in railway operating expenses was largely due to higher wage schedules effective May 1, 1920, established by the United States Railroad Labor Board, to the national labor agreements before mentioned, to increases in prices of fuel and other materials, and to the expense of moving 7.28% heavier passenger traffic and 9.90% heavier freight traffic than in previous year, the traffic volume of 1920 having been the greatest in the Company's history.

Maintenance of Way and Structures increased \$13,571,307.95, or 38.89%. Materials used in maintenance include 527.76 miles of new steel rail; 4,887,913 ties, equal to 1,704.89 miles of continuous track, and 3,316,915, or 578.46 miles of tie plates.

Maintenance of Equipment increased \$11,536,939.05, or 24.03%, the greater equipment mileage incident to heavier traffic necessitating more maintenance work, performed at higher prices for labor and material. Your Company shares with other railways the disastrous effect of under-maintenance of freight cars during Federal control. These cars were used by the Railroad Administration regardless of ownership and were operated principally upon other roads having no ownership interest in their proper maintenance, 87.5% of the Company's box cars being away from home when the roads were returned to private management. With the return of these cars to home lines in large numbers at the close of 1920 and in the early part of 1921, the great extent of their under-maintenance has been developed, and on June 1, 1921, with 80% of our cars on home lines, we find 16% of them are in bad order and require repairs, as compared with 4.6% out of service for repairs when the road went under Federal control at the end of 1917. The work of placing this equipment in proper condition must be undertaken during the current year, at very heavy cost.

Traffic Expenses increased \$1,234,045.92, or 54.68%, due to the higher price conditions affecting all expenses and to the restoration of traffic agencies and bureaus of information for the convenience of the public and to regain traffic diverted from the Company's lines during Government control.

Transportation Expenses increased \$23,947,467.13, or 25.67%, incident to an increase of 10.72% in train mileage required to move the greater traffic of 1920 and to higher wages and increased cost of fuel and other materials. Because of restoration of car and train service of which the public had been deprived during Federal control and to the lack of which they were unwilling to submit when no longer urged by patriotic motives, there was a slight decrease of 0.71% in average freight car load and of 3.89% in the average freight train load, but the passenger train load increased 7.46%. The gross ton mileage moved per pound of fuel (oil equated to coal on basis of four barrels of oil to one ton of coal) shows a slight decrease in freight service and an increase in passenger service. Compared with 1913 the more efficient use of fuel in 1920 is equivalent to a saving of \$5,478,000 and for the seven years 1914 to 1920, inclusive, the saving amounts to \$18,669,000.

Miscellaneous operations increased \$1,377,769.53, or 32.56%, allocating to dining cars, hotels and restaurants, the increases being generally offset by increased revenue received from these sources.

General Expenses increased \$2,010,912.07, or 32.96%, due to increased charges for Federal valuation work, increased accounting requirements incident to Government control and guaranty periods, and higher wage scales.

Item No. 23, Equipment Rents, shows an increase of \$4,874,856.86. This increase allocates to rentals received in 1919, but not in 1920, for ocean steamships leased to the United States Government; to increased rental payments made to the Pacific Fruit Express Company, in which this Company has a half interest; and to the omission during Federal control of rentals for equipment interchanged between railways.

The increase shown in Net Railway Operating Income (line 24) is due to the fact that during the year 1919, and for the months of January and February, 1920, your properties were operated by the U. S. Railroad Administration, under the Federal Control Act, and all operating revenues accrued to, and all operating expenses were borne by, the U. S. Government. For that period your Company received the standard return rental, shown on line 31, as fixed in the agreement with the Director General of Railroads. During the ten months, March 1 to December 31, 1920, the properties were operated by your Company, and the amounts reported in column "Year ended December 31, 1920" (lines 1 to 24), represent the operating revenues and operating expenses for those ten months. As the Government received the revenues and paid the expenses during 1919, with the exception of corporate expenses and war income taxes, the totals this year are therefore shown as increases.

The increase of \$10,573,078.17 in Railway Tax Accruals (line 20) is due to the fact that during the year 1919, and for the months of January and February, 1920, all taxes except war income taxes were assumed by the U. S. Railroad Administration, while subsequent to March 1, 1920, the date on which the U. S. Government relinquished control of your properties, all taxes were borne by the Company.

The decrease of \$5,050,954.82 in Miscellaneous Operating Income (line No. 29) is due to the fact that this year's figures include only two months operations of the California Fuel Oil Department, the property having been sold to Southern Pacific Land Company on February 29, 1920. There is, however, an increase in dividend income of \$4,000,000 on account of dividends received from Southern Pacific Land Company.

The decrease of \$40,201,372.00 in Income from Lease of Road—Standard Return (line No. 31) is due to the fact that this year's figures include the standard return for the months of January and February only while the property was operated by the Government. This decrease is offset by the increase of \$20,416,249.07 in Net Railway Operating Income (line No. 24) and the estimated amount of \$20,490,427.50 in Miscellaneous Income—U. S. Government Guaranty (line No. 41).

The increase of \$1,014,964.39 in Income from Unfunded Securities and Accounts (line No. 39) represents interest on U. S. Government Certificates of Indebtedness, bank acceptances, and increased bank deposits, resulting principally, from the sale of about \$8,500,000 of Liberty Loan bonds in January, 1920, and the unapplied proceeds of the sale in June, 1920, of \$15,000,000 of Series "E," Equipment Trust Certificates.

The decrease of \$220,222.37 in Other Miscellaneous Income (line No. 42) is the result, principally, of a decrease in the credit for lap-over items of revenue prior to January 1, 1918, due not only to the decrease in such items, but also to the fact that since the end of Federal Control such items have been included in the appropriate operating revenue accounts instead of in Miscellaneous Income, in accordance with regulations of the Interstate Commerce Commission.

DEDUCTIONS FROM GROSS INCOME

The decrease of \$40,742.19 in Rent for Leased Roads (line No. 45) is the result, principally, of a payment made last year on account of rental for the year 1918.

The decrease of \$116,766.73 in Miscellaneous Rents (line No. 46) is the result, principally, of a decrease in the rental for pipe line for use of California Fuel Oil Department, the latter having been sold to Southern Pacific Land Company on February 29, 1920.

The increase of \$131,776.02 in Miscellaneous Tax Accruals (line No. 47) is the result, principally, of a general increase in the rate of taxation.

Interest on Funded Debt—Bonds and Notes (line No. 48) shows a decrease for the year of \$167,632.93. The interest was increased \$707,221.67 by the issue this year of the \$15,000,000 of Seven Per Cent. Equipment Trust Certificates, Series "E," and of the \$2,814,000 of Six Per Cent. Equipment Trust obligations issued in payment for equipment assigned by the Director General of Railroads. It was decreased \$619,135.11 by the conversion of Southern Pacific Company Four and Five Per Cent. Twenty-year Convertible bonds; \$126,609.56 by the retirement of bonds through sinking funds, etc.; and \$129,109.93 by the acquisition of bonds by Southern Pacific Company and Proprietary Companies.

The decrease of \$323,763.41 in Interest on Unfunded Debt (line No. 50) represents, principally, interest paid last year on funds borrowed for the purchase of Liberty Loan Bonds.

The decrease of \$122,903.13 in Amortization of Discount on Funded Debt (line No. 51) is the result, principally, of the conversion during the year of \$24,416,500 par value, of Five Per Cent. Twenty-year Convertible bonds into Common Stock, the unextinguished discount on such bonds having been charged to Profit and Loss.

The increase of \$289,443.88 in Other Miscellaneous Income Charges (line No. 53) is due to an adjustment made this year correcting an erroneous debit to "Expenses prior to January 1, 1918," made in December, 1918.

The dividends paid during 1920 were appropriated from the profit and loss surplus, and therefore do not appear in the Income Account. They amount to \$18,209,596.82 for the year, an increase of \$731,137.70. The increase is due to the dividends on stock issued against Five Per Cent. Convertible bonds retired. The figures for this year include \$316,000, and those for last year \$334,000, representing dividends on stocks of Proprietary Companies held by the public.

On December 31, 1920, the principal of advances to the Southern Pacific Railroad Company of Mexico amounted to \$38,799,747.41. The interest accruing on these advances has not been taken into the income of the Southern Pacific Company.

CAPITAL STOCK

The capital stock of the Southern Pacific Company outstanding at the beginning of the year amounted to..... \$302,024,905.64
Issued during the year:

Common stock issued in exchange for a like amount of Five Per Cent. Twenty-Year Convertible Gold Bonds surrendered and cancelled	24,416,500.00
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Amount of Southern Pacific Company capital stock outstanding December 31, 1920.....	\$326,441,405.64
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There was no change during the year in the capital stocks of the Proprietary Companies.

The amounts outstanding December 31, 1920, were as follows:

Preferred stock	\$29,400,000.00
Common stock	317,432,400.00
	<hr/> \$346,832,400.00

Capital stocks of Proprietary Companies outstanding December 31, 1920, were held as follows:

In hands of public.....	\$75,600.00
Owned by Southern Pacific Company.....	\$346,456,800.00
Owned by Morgan's Louisiana & Texas Railroad & Steamship Company.....	300,000.00
	<hr/> 346,756,800.00
	<hr/> \$346,832,400.00

FUNDED DEBT

On June 1, 1920, to provide for the construction and acquisition of new rolling stock, an equipment trust, known as "Southern Pacific Equipment Trust, Series E," was created and an issue of \$15,000,000, par value, Seven Per Cent Equipment Trust Certificates authorized, all of which were issued during the year. The certificates are dated June 1, 1920, and mature serially in lots of \$1,250,000 on June 1 of each year from 1924 to 1935, both inclusive. In accordance with the terms of the trust all of the certificates were guaranteed by the Southern Pacific Company.

The \$2,814,000 of Six Per Cent Equipment Trust Notes to be issued in payment for the 1,000 box cars which the company was compelled to take over from the Director General, as explained in last year's report, were also issued during the year. As the purchase price of such equipment as finally determined upon only slightly exceeded the minimum purchase price, the difference was paid in cash, so that no further equipment notes are to be issued in connection with such equipment.

The funded and other fixed interest-bearing debt of the Southern Pacific Company and of its Proprietary Companies, outstanding December 31, 1919, was as follows:

Southern Pacific Company.....	\$167,608,760.00
Proprietary Companies.....	444,479,901.73
Total outstanding December 31, 1919.....	\$612,088,661.73

Issued during the year:

SOUTHERN PACIFIC COMPANY:	
Seven Per Cent Equipment Trust Certificates, Series "E".....	\$15,000,000.00
Six Per Cent Temporary Equipment Gold Notes.....	2,814,000.00
	<hr/> 17,814,000.00

Retired during the year:

SOUTHERN PACIFIC COMPANY:	
San Francisco Terminal First Mortgage Four Per Cent Bonds:	
Purchased from payments to sinking fund	\$7,100.00
Five Per Cent Twenty-Year Convertible Gold Bonds:	
Retired in exchange for a like amount of common stock issued.....	24,416,500.00

BALANCE SHEET
SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES, COMBINED
ASSETS—DECEMBER 31, 1920, COMPARED WITH DECEMBER 31, 1919, EXCLUDING OFFSETTING ACCOUNTS

ASSETS	DECEMBER 31, 1920	DECEMBER 31, 1919	INCREASE	DECREASE
INVESTMENTS				
Investment in road and equipment.....	\$1,023,128,725.51	\$1,007,467,713.46	\$15,661,012.05	
Improvements on leased railway property.....	4,307,067.10	4,181,212.60	125,854.50	
Sinking funds.....	15,894,531.86	15,072,997.66	821,534.20	
Deposits in lieu of mortgaged property sold.....	14,406,620.76	954.09	14,405,666.67	
Miscellaneous physical property.....(a)	13,785,215.46	32,550,029.13	—	\$18,764,813.67
Investments in affiliated companies:				
Stocks	328,460,971.48	276,077,877.61	52,383,093.87	
Bonds	148,424,714.44	142,891,570.60	5,533,143.84	
Stocks } Cost inseparable.....	11,267,951.70	11,917,751.70	—	649,800.00
Bonds }				
Notes	1,551,407.54	1,208,529.17	342,878.37	
Advances	107,281,536.58	107,990,144.96	—	708,608.38
Other investments:				
Stocks	156,710.29	156,710.29	—	
Bonds	9,021,311.91	15,649,902.44	—	6,628,590.53
Notes	2,032,491.77	2,328,227.78	—	295,736.01
Advances	294,019.97	381,240.98	—	87,221.01
Miscellaneous	2,295,565.08	2,115,678.98	179,886.10	
Total	\$1,682,308,841.45	\$1,619,990,541.45	\$62,318,300.00	
CURRENT ASSETS				
Cash	\$16,452,542.35	\$12,281,635.76	\$4,170,906.59	
Special deposits.....	224,119.20	37,876.78	186,242.42	
Loans and bills receivable.....	59,268.34	194,590.05	—	\$135,321.71
Traffic and car-service balances receivable.....	6,212,714.73	183,363.95	6,029,350.78	
Net balance receivable from agents and conductors.....	5,694,542.13	3,256,128.77	2,438,413.36	
Miscellaneous accounts receivable.....	17,160,402.64	13,904,273.87	3,256,128.77	
Material and supplies.....	40,263,359.08	(b) 1,555,151.07	38,708,208.01	
Interest and dividends receivable.....	2,269,418.00	2,230,709.00	38,709.00	
Rents receivable.....	1,163,745.30	1,221,141.82	—	57,396.52
Other current assets.....	481,779.82	23,726.95	458,052.87	
Total	\$89,981,891.59	\$20,984,324.15	\$68,997,567.44	
ACCOUNTS WITH U. S. RAILROAD ADMINISTRATION				
Standard return.....	\$104,532,608.09	\$96,489,320.06	\$8,043,288.03	
Less received on account.....	74,125,000.00	61,625,000.00	12,500,000.00	
Balance due from U. S. Government.....	\$30,407,608.09	\$34,864,320.06	—	\$4,456,711.97
Cash and agents' and conductors' balances taken over Jan. 1, 1918, revenues prior to Jan. 1, 1918, and other corporate assets collected, etc.....	38,005,388.11	37,775,606.19	\$229,781.92	
Material and supplies, December 31, 1917.....	23,689,556.32	23,468,531.66	221,024.66	
Depreciation and other reserves.....	9,751,386.36	8,670,321.83	1,081,064.53	
Road and equipment retired and not replaced.....	1,127,779.00	1,257,102.56	—	129,323.56
Total	\$102,981,717.88	\$106,035,882.30	—	\$3,054,164.42
U. S. GOVERNMENT				
U. S. Government deficit in guaranty income.....(d)	\$20,490,427.50	—	\$20,490,427.50	
DEFERRED ASSETS				
Working fund advances.....	\$193,392.66	\$43,008.18	\$150,384.48	
Insurance and other funds.....	16,360.00	16,360.00	—	
Other deferred assets.....	8,382,913.27	7,177,875.02	1,205,038.25 *	
Total	\$8,592,665.93	\$7,237,243.20	\$1,355,422.73	
UNADJUSTED DEBITS				
Rents and insurance premiums paid in advance.....	\$202,706.36	\$90,285.79	\$112,420.57	
Discount on capital stock.....	3,988,600.00	3,988,600.00	—	
Discount on funded debt.....	2,400,820.37	3,039,679.78	—	\$638,859.41
Other unadjusted debits	22,343,697.62	3,581,020.76	18,762,676.86	
Securities issued or assumed—Unpledged.....(e)	5,985,175.00	5,924,675.00	60,500.00	
Securities issued or assumed—Pledged.....(e)	156,500.00	156,500.00	—	
Total	\$28,935,824.35	\$10,699,586.33	\$18,236,238.02	
Total assets.....	\$1,933,291,368.70	\$1,764,947,577.43	\$168,343,791.27	

(a) The value of the unsold Central Pacific Railway Company and Oregon & California Railroad Company land grant lands is not included in the above statement of assets. (b) Represents material and supplies of California Fuel Oil Department. (c) See explanatory remarks regarding Guaranty Period Operations. (d) Excluded from total assets and a corresponding amount excluded from outstanding funded debt in accordance with regulations of the Interstate Commerce Commission.

Four and One-half Per Cent Equipment Trust Certificates:	
Series A, due March 1, 1920, paid off.....	\$1,012,000.00
Series B, due September 1, 1920, paid off.....	201,000.00
Series C, due December 1, 1920, paid off.....	117,000.00
Series D, due May 1, 1920, paid off.....	511,000.00
	1,841,000.00
	\$26,264,600.00

CENTRAL PACIFIC RAILWAY COMPANY	
First Refunding Mortgage Four Per Cent Bonds:	
Purchased from payments to sinking fund.....	\$34,500.00
Three and One-half Per Cent Mortgage Gold Bonds:	
Purchased from proceeds of sale of lands.....	\$929,000.00
Purchased from payments to sinking fund.....	30,000.00
	959,000.00
	993,500.00
OREGON & CALIFORNIA RAILROAD COMPANY	
First Mortgage Five Per Cent Bonds:	
Purchased from payments to sinking fund	70,000.00

SOUTH PACIFIC COAST RAILWAY COMPANY	
First Mortgage Four Per Cent Bonds:	
Purchased from payments to sinking fund	238,000.00
SOUTHERN PACIFIC RAILROAD COMPANY	
First Refunding Mortgage Four Per Cent Gold Bonds:	
Purchased from payments to sinking fund	16,000.00
TEXAS & NEW ORLEANS RAILROAD COMPANY	
Payment to State of Texas account of School Fund Debt.....	4,790.78
Total retired during the year.....	27,586,890.78
Amount of funded and other fixed interest-bearing debt of the Southern Pacific Company and of its Proprietary Companies, outstanding December 31, 1920.....	\$602,315,770.95
The outstanding securities were held as follows:	
In hands of public.....	\$491,582,870.50
Owned by Southern Pacific Company.....	\$94,876,900.45
Owned by Proprietary Companies.....	2,125,000.00
Held in sinking funds of Proprietary Companies	13,731,000.00
Total	\$602,315,770.95

BALANCE SHEET

SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES, COMBINED
LIABILITIES—DECEMBER 31, 1920, COMPARED WITH DECEMBER 31, 1919, EXCLUDING OFFSETTING ACCOUNTS

LIABILITIES	DECEMBER 31, 1920	DECEMBER 31, 1919	INCREASE	DECREASE
STOCK				
Capital stock of Southern Pacific Company.....	\$326,441,405.64	\$302,024,905.64	\$24,416,500.00	
Capital stock of Proprietary Companies.....(a)	346,832,400.00	346,832,400.00		
Total stock outstanding.....	\$673,273,805.64	\$648,857,305.64	\$24,416,500.00	
Premium on capital stock of Southern Pacific Company.....	\$6,304,440.00	\$6,304,440.00		
Total.....	\$679,578,245.64	\$655,161,745.64	\$24,416,500.00	
LONG TERM DEBT				
Funded debt unmatured:				
Book liability.....	\$608,457,445.95	\$618,169,836.73	—	\$9,712,390.78
Less held by or for companies.....	6,141,675.00	6,081,175.00	\$60,500.00	
Actually outstanding:				
Southern Pacific Company.....	\$159,158,160.00	\$167,608,760.00	—	\$8,450,600.00
Proprietary Companies.....(a)	443,157,610.95	444,479,901.73	—	1,322,290.78
Total funded debt.....	\$602,315,770.95	\$612,088,661.73	—	\$9,772,890.78
Nonnegotiable debt to affiliated companies:				
Open accounts.....	47,792,526.82	5,482,434.97	\$42,310,091.85	
Total.....	\$650,108,297.77	\$617,571,096.70	\$32,537,201.07	
CURRENT LIABILITIES				
Loans and bills payable.....	\$5,000,000.00	—	\$5,000,000.00	
Traffic and car-service balances payable.....	10,112,285.10	\$82,354.41	10,029,930.69	
Audited accounts and wages payable.....	28,517,473.11	1,134,611.16	27,382,861.95	
Miscellaneous accounts payable.....	3,395,273.09	1,654,735.02	1,740,538.07	
Interest matured unpaid.....	4,554,009.33	5,030,633.14	—	\$476,623.81
Dividends matured unpaid.....	4,683,119.58	4,622,115.76	61,003.82	
Funded debt matured unpaid.....	29,213.92	62,213.92	—	33,000.00
Unmatured interest accrued.....	4,979,378.44	4,813,872.14	165,506.30	
Unmatured rents accrued.....	294,176.59	288,393.77	5,782.82	
Other current liabilities.....	898,064.18	51,492.17	846,572.01	
Total.....	\$62,462,993.34	\$17,740,421.49	\$44,722,571.85	
ACCOUNTS WITH U. S. RAILROAD ADMINISTRATION				
Advances for additions and betterments.....	\$25,463,867.72	\$24,592,835.48	\$871,032.24	
Advances for expenses prior to January 1, 1918, and other corporate liabilities paid, etc.....	51,166,637.10	47,811,802.81	3,354,834.29	
Agents' and conductors' balances February 29, 1920.....	594,037.01	—	594,037.01	
Federal material and supplies February 29, 1920.....	24,061,913.39	—	24,061,913.39	
Total.....	\$101,286,455.22	\$72,404,638.29	\$28,881,816.93	
DEFERRED LIABILITIES				
Other deferred liabilities.....	\$208,864.09	\$53,476.61	\$155,387.48	
UNADJUSTED CREDITS				
Tax liability.....	\$1,878,273.38	\$4,166,294.49	—	\$2,288,021.11
Insurance and casualty reserves.....	3,182,804.69	3,309,723.29	—	126,918.60
Operating reserves.....	4,342,251.64	—	\$4,342,251.64	
Accrued depreciation—Road.....(d)	1,489,080.76	1,322,017.17	167,063.59	
Accrued depreciation—Equipment.....	54,583,951.21	51,348,247.38	3,235,703.83	
Accrued depreciation—Miscellaneous physical property.....	—	8,541,207.84	—	8,541,207.84
Other unadjusted credits.....(e)	86,553,083.02	58,439,936.81	28,113,146.21	
Total.....	\$152,029,444.70	\$127,127,426.98	\$24,902,017.72	
CORPORATE SURPLUS				
Additions to property through income and surplus.....	\$1,575,921.24	\$1,404,504.31	\$171,416.93	
Funded debt retired through income and surplus.....	23,333,510.55	22,302,877.20	1,030,633.35	
Sinking fund reserves.....	11,602,666.84	11,177,796.69	424,870.15	
Appropriated surplus not specifically invested.....	3,818,177.83	3,818,177.83	—	
Total appropriated surplus.....	\$40,330,276.46	\$38,703,356.03	\$1,626,920.43	
Profit and loss—Balance.....	247,286,791.48	236,185,415.69	11,101,375.79	
Total corporate surplus.....	\$287,617,067.94	\$274,888,771.72	\$12,728,296.22	
Total liabilities.....	\$1,933,291,368.70	\$1,764,947,577.43	\$168,343,791.27	

(a) The outstanding capital stock and funded debt include capital stocks and funded debt of Proprietary Companies of the par value of \$346,756,800 and \$110,732,900.45, respectively, a total of \$457,489,700.45, which securities are owned by the Southern Pacific Company or by Proprietary Companies, or are held in sinking funds of Proprietary Companies. The cost of these securities is included in the investments shown above. Of the said amount, stocks of the par value of \$249,653,161, which stand charged on the books at \$232,932,667.41, are pledged against the issue of Southern Pacific Company stock and bonds. (d) Represents accrued depreciation on electric power plants and substations, general office building at San Francisco, wood preserving works, Sacramento rolling mill, oil storage plants, grain elevators, and similar facilities. (e) Represents, principally, interest on construction advances which have not been repaid.

ADDITIONAL ROLLING STOCK AND FLOATING EQUIPMENT

As indicated in last year's report, the following rolling stock, ordered to provide for increased requirements and to replace vacated equipment, was included in Southern Pacific Equipment Trust, Series E, created June 1, 1920:

72 locomotives
4,815 freight-train cars
50 passenger-train cars
140 electric cars

The total estimated purchase price of such equipment is \$22,500,000. Of this amount the sum of \$15,000,000 has been provided by the equipment trust certificates issued under the above-named trust, and the remaining \$7,500,000 will be provided out of the general funds of the company. A part of such equipment has been placed in service, and it is expected that the remainder will be delivered and placed in service during the calendar year 1921.

In addition to the above equipment there were delivered by outside builders or completed at company's shops during the year 3 locomotives, 16 passenger-train cars, 251 freight-train cars, and 4 electric cars, the total cost of which was \$971,000.

Of the four steamships mentioned in last year's report, the freighter El Estero was placed in service November 24, 1920; the freighter El Isleo, January 20, 1921; and the freighter El Lago, March 14, 1921. It is expected that the tank steamer Tamiahua will be completed and delivered during the latter part of 1921. The contract price of these four steamers is \$7,430,000.

THE SUIT INVOLVING THE RIGHT OF THE SOUTHERN PACIFIC COMPANY TO OWN THE STOCK OF THE CENTRAL PACIFIC RAILWAY COMPANY

In last year's report (page 22) it was stated that this case was pending before the Supreme Court of the United States on an appeal by the Government from a decision against it in the lower Court, and that it was expected that the case would be argued and submitted at the October Term, 1920. The case came up for hearing in the Supreme Court on April 17, 1921; and, after full oral argument, was submitted on April 19th and taken under advisement by the Court. An early decision is expected.

CONTROVERSY ARISING OUT OF THE OREGON & CALIFORNIA RAILROAD'S LAND GRANT

This is an accounting suit brought in 1917 by the United States seeking to offset against the compensation of \$2.50 per acre, due the Company for the unsold lands, moneys received by the Company, in excess of \$2.50 per acre, by reason of past sales, leases, and otherwise, as well as taxes levied since the forfeiture decision in 1913 and voluntarily paid by the Federal Government to the State of Oregon. This case is ready for trial and will probably be heard and decided in the United States District Court of Oregon some time during 1921.

SEPARATION OF CALIFORNIA OIL PROPERTIES— INCLUDING STOCKHOLDING IN ASSOCIATED OIL COMPANY— FROM RAILROAD PROPERTIES

At a meeting held December 1, 1920, your board of directors adopted the following plan for the separation of the California oil properties—including the stockholding in the Associated Oil Company—from the railroad properties.

A new company, known as the Pacific Oil Company, was organized under the laws of the State of Delaware with a capital stock of 3,500,000 shares of no par value, and the Southern Pacific Company subscribed for the entire capital stock at \$15.00 per share. Of the \$52,500,000 so realized the new company retained \$8,750,000 as a working capital and expended the remainder, \$43,750,000, in purchasing from the Southern Pacific Land Company (the entire capital stock of which is owned by the Southern Pacific Company)—

(a) About 259,000 acres of land owned by the Southern Pacific Land Company, situate in the State of California, of which about 25,000 acres are proven oil lands and the remainder lands heretofore withdrawn from sale as possible oil lands, together with existing field improvements and materials and supplies;

(b) 200,690 shares, par value \$20,069,000, representing 50.48% of the outstanding capital stock of the Associated Oil Company.

Holders of the capital stock of the Southern Pacific Company registered as such on the books of the company at the close of business on January 14, 1921, were given the right to purchase at Fifteen dollars (\$15.00) per share, payment to be made in full on or before March 1, 1921, one share of stock of the new company for each share of Southern Pacific Company stock so held.

The capital stock of the new company was fixed at 3,500,000 shares, to correspond as nearly as possible to the total number of shares of Southern Pacific Company stock outstanding together with the number of shares reserved for conversion of the company's 5% convertible bonds. Holders of \$38,329,500 of these bonds subsequently exchanged their bonds for Southern Pacific Company stock, so that as of January 14, 1921, there were 3,443,809 shares of Southern Pacific Company stock outstanding.

Southern Pacific Company stockholders, or their assigns, purchased an aggregate of 3,414,604 shares of Pacific Oil Company stock, thus leaving in the company's treasury at this date 85,396 shares of such stock, which will be held subject to such disposition as your board of directors may determine.

LOS ANGELES UNION TERMINAL COMPANY

The Southern Pacific Company has acquired the entire capital stock, \$3,250,000 par value, of the Los Angeles Union Terminal Co. in exchange for value of lands transferred to the Terminal Company and a part of the construction costs incurred. This enterprise occupies nineteen acres of land at Seventh Street and Central Avenue, being in the heart of the newer wholesale district, and at the intersection of the principal east and west retail street of the city and the lines of your company. The major part of the wholesale produce and fruit business of the city is carried on at this terminal, and in addition a number of important manufacturing and jobbing firms have their plants established there. Two six-story reinforced concrete buildings, with basements, having a rentable floor area of 846,906 square feet, or 19.5 acres, have been erected, and a third is under construction. The market section is of two-story concrete buildings, supplied in part with basements and with a rentable floor area of 405,352 square feet, or 9.3 acres. The completed buildings are at this time 98.8 per cent. rented. The terminal company is served exclusively by the Southern Pacific Company and its subsidiary the Pacific Electric Railway Company, the latter under agreement doing all the switching for both companies. The enterprise is productive of a very large freight traffic for your company.

LOS ANGELES PUBLIC MARKET COMPANY

Your company has also acquired substantially all the stock of the Los Angeles Public Market Company owning fifteen and one-half acres of land at Sixth and Alameda Streets, one block from the site of the Los Angeles Union Terminal Company.

This property, formerly the site of the Los Angeles Produce Market until the produce business outgrew its facilities, it is planned eventually to use for railway purposes.

At this time the buildings thereon are rented to 85% of capacity, the tenants including overflow from produce section of the Los Angeles Union Terminal Co., the terms of occupancy being such as to permit without delay the use of the property for railway purposes when needed.

PROPERTIES AND MILEAGE

The transportation lines of the Southern Pacific Company, and of certain affiliated companies herein referred to as "Proprietary Companies," constituting the Southern Pacific Transportation System, operated at December 31, 1920, were as follows:

In addition to the 11,209.07 miles above tabulated, the Southern Pacific

Divisions	First Main Track	Additional Main Track	Sidings	Ferries	Water Lines
A—MILEAGE OF LINES OPERATED BY SOUTHERN PACIFIC COMPANY:					
1. Owned by Southern Pacific Company:					
Rail lines	547.72	15.88	213.22	—	4,400.00
Water lines	—	—	—	—	—
2. Leased from Proprietary companies:					
(a) Central Pacific Railway	2,288.97	253.43	944.47	9.90	125.00
(b) Oregon & California Railroad	701.50	4.60	186.95	—	—
(c) Southern Pacific Railroad	3,491.07	207.83	1,525.49	3.00	—
(d) South Pacific Coast Railway	105.14	20.46	49.12	3.00	—
B—MILEAGE OF LINES OPERATED BY THE FOLLOWING PROPRIETARY COMPANIES:					
1. Arizona Eastern R. R. Co.	382.66	—	82.52	—	—
2. Houston & Texas Central R. R. Co.	932.82	14.56	274.34	—	—
3. Galveston, Harrisburg & San Antonio Ry. Co.	1,380.03	45.25	438.44	—	—
4. Texas & New Orleans R. R. Co.	475.54	11.83	218.88	—	—
5. Houston East & West Texas Ry. Co.	191.60	.89	65.52	—	—
6. Houston & Shreveport R. R. Co.	40.74	.69	6.94	—	—
7. Morgan's Louisiana & Texas R. R. & S. S. Co.	400.67	58.35	250.74	3.00	—
8. Louisiana Western R. R. Co.	207.74	—	87.72	—	—
9. Lake Charles & Northern R. R. Co.	72.66	—	12.20	—	—
10. Iberia & Vermilion R. R. Co.	21.44	—	11.21	—	—
11. Southern Pacific Terminal Co.	—	—	25.05	—	—
Total	11,240.30	633.77	4,392.81	18.90	4,525.00
Less mileage used in connection with property of two or more of above companies and included in mileage of each	31.23	29.99	69.07	—	—
Total miles of road operated at December 31, 1920	*11,209.07	603.78	4,323.74	18.90	4,525.00
Total miles of road operated at December 31, 1919	11,089.68	771.60	4,249.00	18.90	4,525.00
Increase	119.39	—	74.74	—	—
Decrease	—	167.82	—	—	—
Average miles of road operated during year 1920	11,151.60	618.93	—	—	—

*Includes 11.05 miles owned jointly with other companies, 4.37 miles leased from other companies, and 160.63 miles operated under trackage rights, and excludes 41.34 miles of owned lines leased to other companies.

The carrying out of this plan has completely divorced the California oil properties from the railroad properties.

SOUTHERN PACIFIC RAILROAD COMPANY OF MEXICO

The value of the property damaged or destroyed from the beginning of the Madero revolution in 1910 down to December 31, 1920 (including that damaged or destroyed during the revolution against Carranza) now amounts to 5,421,326 pesos, equivalent to \$2,710,663. While the company has been unable to make any collections this year on account of these depredation claims, the claims were checked during October, November and December, 1920, by representatives of the Government in connection with representatives of the Company and no serious objections were raised to the claims as originally filed. The Company has claims against the Mexican Government aggregating 15,935,586 pesos, equivalent to \$7,967,793, representing amounts due for freight and passenger service performed, for rental of road and equipment, and for materials furnished to or confiscated by the various military authorities. About one-half of these latter claims have been filed with the proper departments of the Government, and the remainder are in the hands of our fiscal representative in the City of Mexico and are being filed as rapidly as the congested condition of the departments will permit. Since the inauguration of President Obregon on December 1, 1920, payments amounting to 128,680 pesos have been made on account of these latter claims, while additional claims amounting to 587,350 pesos have been approved for payment.

The Company has also filed claims aggregating 5,908,816 pesos equivalent to \$2,954,408, for the cost of restoring the Alamos and Tonichi Branches and the main line from Acaponeta to Tepic, the operation of which we were compelled to abandon in the spring of 1913. These claims are, of course, subject to correction when these lines are restored and again placed in operation and the actual cost can be determined.

The average miles of road operated during the year was 1,001.47 miles, and only such maintenance work was carried on as was found necessary for the operation of trains over those portions of the line open for traffic.

Company solely controls through ownership of capital stock, 854.34 miles of Affiliated Companies and 1,240.52 miles of the Southern Pacific R. R. Co. of Mexico, and jointly controls (through ownership of capital stock in equal proportions) with the Atchison, Topeka & Santa Fe Ry. Co. 534.42 miles of the Northwestern Pacific Railroad and 59.66 miles of the Sunset Railway and with Messrs. John D. and A. B. Spreckels, 156.15 miles of the San Diego & Arizona Railway, a GRAND TOTAL OF 14,054.16 MILES.

GENERAL

Dividends on the capital stock of your Company were declared during the year, payable as follows:

1½ per cent. paid April 1, 1920	\$4,531,054.93
1½ per cent. paid July 1, 1920	4,531,303.17
1½ per cent. paid October 1, 1920	4,531,311.08
1½ per cent. payable January 3, 1921	4,615,611.64

Total

On May 15, 1920, the Southern Pacific Equipment Company was organized under the laws of California, for the purpose of constructing and acquiring equipment for Southern Pacific Company and its affiliated companies. All the outstanding capital stock of the new company is owned by Southern Pacific Company. Of the new equipment mentioned on page 20 the Southern Pacific Equipment Company is building 30 locomotives, 2,000 box cars, 1,000 stock cars, 1,000 flat cars, and 65 caboose cars. It is also building 1,000 of the 4,000 new refrigerator cars included in the Pacific Fruit Express Equipment Trust mentioned in last year's report.

Under the pension system put into effect January 1, 1903, there were carried on the pension rolls at the end of the year 1,022 employees. The payments to pensioners for the year amounted to \$465,566.62.

By order of the Board of Directors,

JULIUS KRUTTSCHNITT,

Chairman of the Executive Committee.

[ADVERTISEMENT]

(Continued from page 42)

day at 97¼ and accrued interest, to yield about 6.80 per cent, and was twice oversubscribed by midday.

The bonds are not redeemable before maturity and are secured by the deposit as collateral of \$8,225,000 face value Illinois Central refunding mortgage 4 per cent gold bonds, due 1955, and \$3,820,000 face value Illinois Central and Chicago, St. Louis & New Orleans Railroad joint refunding mortgage 5 per cent bonds, due 1963. The issuance of the bonds is subject to the approval of the Interstate Commerce Commission.

MINNEAPOLIS & ST. LOUIS.—Loan for Equipment Approved.—The Interstate Commerce Commission has approved a loan of \$386,190 to this company to be used in the purchase of 15 freight locomotives at \$64,365 each through the National Railway Service Corporation. The company had asked for a loan of \$4,398,500. Commissioner Daniels wrote a dissenting opinion similar to that in the case of the Chicago, Rock Island & Pacific above noted.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—Authorized to Issue Equipment Notes.—This company has been authorized by the Interstate Commerce Commission to issue and sell \$2,400,000 of equipment notes.

NEW YORK, NEW HAVEN & HARTFORD.—Application for a Loan.—This company has applied to the Interstate Commerce Commission for a loan of \$8,000,000 for 15 years from the revolving fund to reimburse the treasury for payments to retire maturities and to provide for additions and betterments amounting to \$1,401,000.

ORANGEBURG.—Authorized to Abandon Line.—This company has been authorized by the Interstate Commerce Commission to abandon its line between Orangeburg and North, S. C., a distance of 17.7 miles.

READING COMPANY.—Annual Report.—The annual report for the year ended December 31, 1920, of this company, which is the holding company for the Philadelphia & Reading Railway, the Philadelphia & Reading Coal & Iron Company, etc., shows the following income account as compared with the calendar year 1919:

	1920	1919
Receipts:		
Interest and dividend receipts.....	\$11,942,639	\$11,600,508
Rent of equipment.....	3,773,830	3,772,605
Rent of Delaware River wharves and other property.....	349,864	374,520
	\$16,066,333	\$15,747,633
Expenses:		
Contingent.....	125,988	98,905
	\$15,940,345	\$15,648,728
Deductions from income:		
Interest on funded debt.....	\$3,756,510	\$3,759,930
Interest on unfunded debt.....	192,475	278,834
Interest on Reading Company—Jersey Central Collateral Bonds.....	920,000	920,000
Interest on Wilmington & Northern R. R. stock trust certificates.....	51,800	51,800
Interest on real estate bonds.....	76,184	76,113
Rental of leased equipment.....	442,125	482,625
Taxes.....	779,508	708,125
	\$6,218,602	\$6,277,427
Surplus	\$9,721,743	\$9,371,302

SALT LAKE & UTAH.—Loan Approved.—The Interstate Commerce Commission has approved a loan to this company of \$700,000 from the revolving fund to provide for additions and betterments and to meet maturing indebtedness.

SAN DIEGO & ARIZONA.—Asks Authority to Guarantee Trust Certificates.—This company has applied to the Interstate Commerce Commission for authority to guarantee an issue of \$750,000 of equipment trust certificates signed by the Anglo-California Trust Company.

SAN DIEGO & ARIZONA.—Asks Authority to Transfer Rolling Stock.—This company has applied to the Railroad Commission of California for permission to transfer its rolling stock under an equipment trust agreement, and to deliver to the Anglo California Trust Company of San Francisco, a mortgage on certain real estate in San Diego county.

SOUTHERN PACIFIC.—Annual Report.—The combined income account for the year ended December 31, 1920, compares with the previous year as follows:

	1920	1919
Operating income (March 1 to Dec. 31, 1920, inclusive):		
Operating revenues.....	\$240,381,492	
Operating expenses.....	207,186,859	
Net from railway operations.....	33,194,633	

Taxes.....	13,006,696	
Net railway operating income.....	16,524,941	
Total operating income.....	17,718,104	
Non-operating income:		
Income from lease of road—standard return	8,043,288	\$48,244,660
U. S. Government guaranty.....	20,490,428	
Dividend income.....	5,251,324	1,182,039
Total non-operating income, including other.....	39,892,612	55,105,210
Gross income.....	55,610,716	57,458,020
Total deductions from gross income.....	25,540,441	25,909,413
Net income.....	32,070,275	31,548,607
Disposition of net income:		
Income applied to sinking and other reserve funds.....	1,053,945	1,022,864
Dividend appropriations.....		17,478,459
Total appropriations.....	1,053,945	18,501,323
Balance to profit and loss.....	\$31,016,329	\$13,047,284

An abstract of the report appears on adjacent pages. The report will be reviewed editorially in an early issue.

WHEELING & LAKE ERIE.—Loan for Equipment Approved.—The Interstate Commerce Commission has approved a loan to this company of \$3,304,000 to be used in the purchase of 2,000 gondolas at \$2,650 each and 1,000 box cars at \$2,960 each through the National Railway Service Corporation. The company had applied for a larger loan. Commissioner Daniels wrote a dissenting opinion similar to that in the case of the Chicago, Rock Island & Pacific above noted.

Settlements With Railroad Administration

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts: Galveston Wharf Company, \$85,000; the Duluth Union Depot & Transfer Company, \$21,000; St. Joseph Belt, \$95,000; Chicago River & Indiana, \$45,000; Chicago Junction, \$380,000; Hudson & Manhattan, \$750,000. The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the administration during the 26 months of federal control.

Guaranty Certificates Issued

The Interstate Commerce Commission has issued certificates for partial payments on account of the six months' guaranty for 1920 as follows:

Chicago, Peoria & St. Louis.....	\$110,000
Denver & Rio Grande.....	937,500
Grand Canyon.....	9,500
Panhandle & Santa Fe.....	550,000
Rio Grande, El Paso & Santa Fe.....	40,000

Total payments of the Treasury Department under the provisions of the Transportation Act up to June 25 were as follows:

(a) Under Section 204, for reimbursement of deficits during Federal Control.....	\$1,354,339.74
(b) Under Section 209:	
(1) To carriers to which final payment of the guaranty has been made under paragraph (g), including previous advances under paragraphs (h) and (i)....	1,690,114.71
(2) For advances under paragraphs (h) and (i) to carriers as to which a certificate for final payment has not been received by the Treasury from the Interstate Commerce Commission....	262,950,874.00
(c) Under Section 212:	
(1) For partial payments in respect to the guaranty provided in Section 209.....	156,874,190.05
(2) For partial payments in respect to the reimbursement for deficits during the period of federal control provided in Section 204.....	562,853.02
(d) Under Section 210, for loans from the revolving fund of \$300,000,000 therein provided.....	197,289,487.00
Total.....	\$620,721,858.52

These figures are exclusive of various settlements and payments on account made by the Railroad Administration.

Dividends Declared

Atchison, Topeka & Santa Fe.—Common, 1½ per cent, quarterly, payable September 1, to holders of record July 29.
Central of New Jersey.—2 per cent, quarterly, payable August 1, to holders of record July 20; special, 2 per cent, semi-annually, payable June 30, to holders of record June 27.
Elmira & Williamsport.—Preferred, 3.16, payable July 1, to holders of record June 20.
New London Northern.—2 per cent, quarterly, payable July 1, to holders of record June 16.
Norfolk & Western.—Common, 1¾ per cent, quarterly, payable September 19, to holders of record August 31; preferred, 1 per cent, quarterly, payable August 19, to holders of record July 30.
Norwich & Worcester.—Preferred, 2 per cent, quarterly, payable July 1, to holders of record June 16.
Pennsylvania Company.—3 per cent, semi-annually, payable June 30, to holders of record June 22.
Rome & Clinton.—3 per cent, payable July 1, to holders of record June 22.
Western Pacific R. R. Corp.—Preferred, 1½ per cent, quarterly, payable July 1, to holders of record June 21.

Railway Officers

Financial, Legal and Accounting

John C. Hume, assistant claim agent of the International & Great Northern, with headquarters at San Antonio, Tex., whose promotion to general claim agent, with headquarters at Palestine, Tex., was announced in the *Railway Age* of June 3 (page 1301), was born at Union City, Ind., on April 23, 1878. He was educated in the public schools of San Antonio, Tex., and entered railway service on July 1, 1895, as a messenger in the service of the International & Great Northern at San Antonio. He has served this company continuously for 26 years. After serving in the local freight offices at San Antonio, he was transferred to the ticket office, where he served until 1904, when he was promoted to assistant claim agent, with the same headquarters. He was serving in this position at the time of his recent promotion, effective in May, following the death of J. S. O'Flynn.



J. C. Hume

Herbert W. Johnson, whose election as controller of the Chicago, Burlington & Quincy was announced in the *Railway Age* of June 10 (page 1378), was born at Chicago on November 24, 1879, and entered railroad service on May 1, 1898, in the office of the auditor of ticket accounts of the Burlington. His entire railroad career has been spent in the service of that company. On January 24, 1905, he was appointed traveling auditor, and three years later was made clerk in charge of a department in the office of the auditor of freight accounts at Chicago. He was promoted to chief clerk of claims under the auditor of freight accounts on December 7, 1909, and in November of the following year was appointed assistant auditor of freight accounts. On November 1, 1913, he was appointed assistant auditor of expenditures, and four years later was promoted to auditor of expenditures. At the time of his recent election, Mr. Johnson was serving as assistant controller, with headquarters at Chicago, a position to which he had been promoted on March 1, 1920.



H. W. Johnson

Operating

D. E. Beatty, roadmaster, of the Louisville & Nashville, with headquarters at Nashville, Tenn., has been promoted to superintendent of the Mobile and Montgomery division, with

headquarters at Montgomery, Ala., effective July 1, succeeding J. I. McKinney, retired.

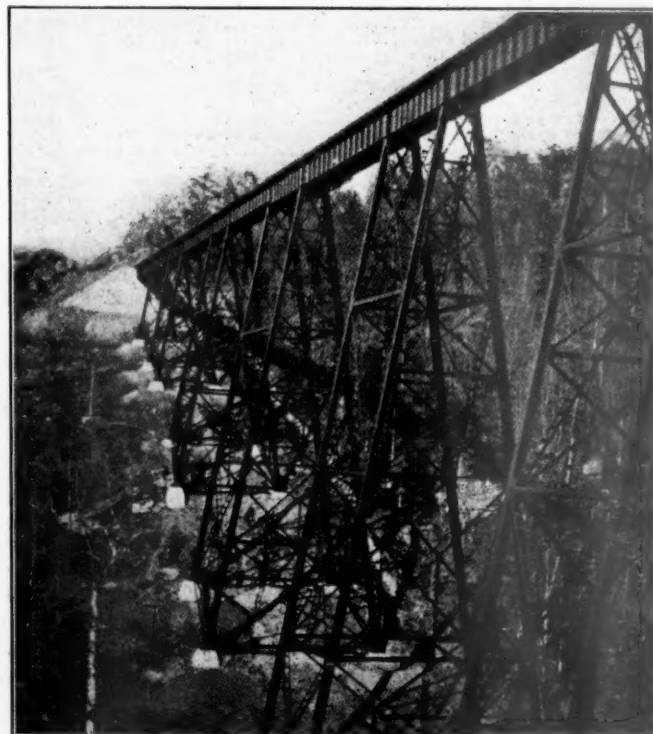
W. L. Barnes, superintendent transportation of the Chicago, Burlington & Quincy, with headquarters at Chicago, who has been on leave of absence, permitting him to serve as executive manager, Car Service Division, American Railway Association, with headquarters at Washington, D. C., has returned to his former duties and has been appointed general superintendent transportation. **J. H. Aydelott**, acting superintendent transportation, with headquarters at Chicago, has been promoted to superintendent transportation, with the same headquarters, and the position of assistant superintendent transportation has been abolished. The appointments were effective July 1.

Traffic

Roy Pope has been appointed general freight agent of the Americus & Atlantic with headquarters at Atlanta, Ga.

Joseph N. Campbell, whose appointment as general freight and passenger agent of the Louisiana Railway & Navigation, with headquarters at Shreveport, La., was announced in the *Railway Age* of June 3 (page 1301), was born at Pocahontas, Ark., on September 26, 1877, and was educated at Add-Ran University, Tex. For some time Mr. Campbell was engaged in Indian educational work, and as a newspaper man in Indian territory and Oklahoma territory. He entered railroad service on April 3, 1903, in the freight department of the Chicago, Rock Island & Pacific. A year later he took similar service with the Fort Worth & Denver City, and in 1905 took a position in the freight claim department of the Atchison, Topeka & Santa Fe, as chief clerk at Amarillo, Tex. Mr. Campbell entered the service of the Louisiana Railway & Navigation in February, 1906, as chief clerk in the freight claim department. At the time of his recent appointment, he was serving as freight claim agent to which he had been promoted in May, 1919.

THE FROG SHOP of the Lehigh Valley at Weatherby, Pa., is to resume operation on July 5 after a suspension of three months.



An Example of Virginian Engineering—the Black Lick Viaduct, 207 Ft. High